

NEW GENERA, SPECIES, AND RECORDS OF NEW WORLD ALYSIINAE
(HYMENOPTERA: BRACONIDAE)

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Abstract.—Three Palaearctic genera of the Alysiinae (*Apronopa* Achterberg, *Epimicta* Foerster, and *Laotris* Nixon) are recorded from North America for the first time. New species which expand the definition of their respective genera are described in *Aphaereta* Foerster, *Epimicta*, *Phaenocarpa* Foerster, and *Pneumosema* Fischer. The placement of several New World species in *Asobara* Foerster, *Aspilota* Foerster, and *Synelix* Foerster is discussed. *Sarops* Nixon, 1942 is synonymized with *Coelinius* Nees, 1812 and *Trisynaldis* Fischer, 1958 is synonymized with *Aphaereta* Foerster, 1862. Two genera from South America and nine species from the New World are described as new: *Epimicta griffithsi*, *Aphaereta confusa*, *Dapsildiastema*, *D. angusta*, *D. crassa*, *Phaenocarpa anomala*, *P. cratomorpha*, *P. sharkeyi*, *Pneumosema perditum*, *Vachterbergia*, and *V. grayi*. Species groups are described for one assemblage in *Aphaereta* and two in *Phaenocarpa*. These species groups are described to facilitate resolution of problems regarding the monophyly of *Aphaereta* and *Phaenocarpa*.

Key Words: Insecta, Diptera, parasitoid, Dacnusiini

Marsh et al. (1987) presented a key to the North American genera of Braconidae. A number of new genera have subsequently been discovered, and several nomenclatural changes have been made (e.g. Quicke and Sharkey 1989). An expanded version of this key, covering the entire New World and incorporating these changes, is now being developed. To facilitate preparation of the portion covering the subfamily Alysiinae, several new taxa and distribution records are reported here.

The Alysiinae are presently divided into two tribes of roughly equal size (Shenefelt 1974). The Dacnusiini are well characterized as monophyletic by the loss of fore wing vein r-m. The Alysiini, however, are probably paraphyletic since they are not currently defined on the basis of apomorphic traits. The two tribes are therefore recog-

nized here only for convenience, pending further study. For a general overview of the Dacnusiini, see Griffiths (1964) and Riegel (1982), and for the New World Alysiini, see Wharton (1980). Shenefelt (1974) provides detailed synonymies, and Achterberg (1983, 1988) includes useful updates.

A third tribe, Exodontiellini, was transferred to the Alysiinae by Quicke and Achterberg (1990). I retain the Exodontiellini in the Opiinae for reasons outlined in Wharton (1988). Additionally, the Alysiinae are characterized by having the mid-ventral suture on the mesothorax unusually broad and crenulate. The suture in exodontiellines, however, is as smooth and narrow as it is in opiines, gnamptodontines, and many other braconids. Some exodontiellines have a weak basal area on the second tergum, similar in size and position to that of

gnamptodontines. Although the facial features of gnamptodontines and exodontiellines are dissimilar, further investigation of the relationship between these two taxa is warranted.

Measurements are as in Wharton (1977), with some modification as noted by Wharton (1986). Values for ratios are given to the nearest 0.05. Wing terminology has been changed in an attempt to conform with the increasingly more widely used Comstock-Needham system, as illustrated in Figs. 36, 37. Museum acronyms used in the text are explained in the acknowledgments section.

Tribe Dacnusiini

Genus *Coelininus* Nees von Esenbeck

Coelininus Nees von Esenbeck, 1818: 301.
Type species: *Stephanus parvulus* Nees, 1812 (monobasic).

Chaenon Curtis, 1829: 289; Haliday 1833: 264; 1839: 20 (synonymy). Type species: *Chaenon anceps* Curtis, 1829 (original designation).

Copisura Schioedte, 1837: 603; Dalla Torre 1898: 20 (synonymy); Maréchal 1938: 204–212 (redescription). Type species: *Copisura rimator* Schioedte, 1837 (monobasic).

Lepton Zetterstedt, 1838: 403; Dalla Torre 1898: 20 (synonymy). Type species: *Lepton attenuator* Zetterstedt, 1838 (monobasic).

Polemochartus Schulz, 1911: 61; Griffiths 1964: 857 (synonymy). Type species: *Polemon liparæ* Giraud, 1863 (subsequent designation).

Coelinidea Viereck, 1913: 555; Griffiths 1964: 846, 857–858 (subgenus of *Coelininus*). Type species: *Stephanus niger* Nees, 1812 (monobasic and original designation).

Eriocoelininus Viereck, 1913: 555; Griffiths 1964: 858 (synonymy with *Coelininus* and *Coelinidea*). Type species: *Coelininus longulus* Ashmead, 1888 (monobasic and original designation).

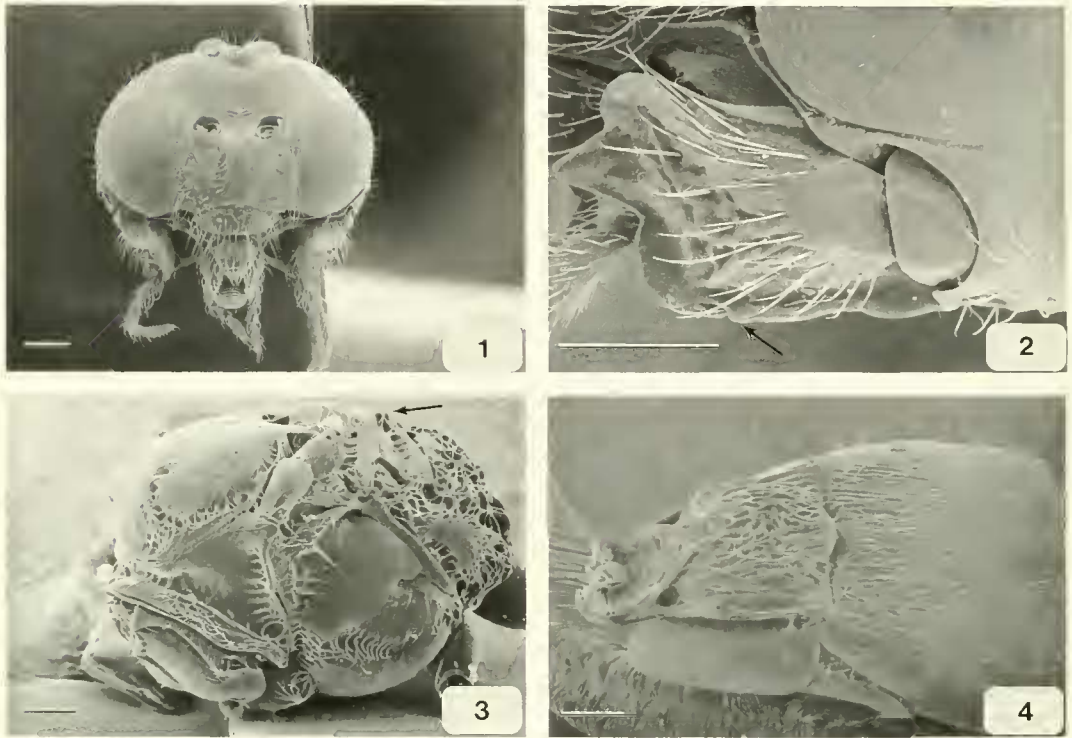
Sarops Nixon, 1942: 133; Griffiths 1964:

857 (as synonym of *Synelix* Foerster). Type species: *Sarops rea* Nixon, 1942 (monobasic and original designation).
New Synonym.

The *Coelininus* group is defined here to include the nominate genera *Coelininus* Nees, *Lepton* Zetterstedt (= *Coelinidea* Viereck), *Polemochartus* Schulz, and *Sarops* Nixon. All are parasitoids of Chloropidae, have an additional mandibular tooth between tooth 1 and 2 (Wharton and Austin 1991, Figs. 11, 12), and have at least some degree of lateral compression in the female abdomen. Maetô (1983b) lists and discusses additional character states. *Laotris* Nixon and *Synelix* Foerster also have an additional tooth variously developed between tooth 1 and 2, but do not attack chloropids, and have the abdomen dorsal-ventrally depressed. Since they lack two of the putative synapomorphs defining the *Coelininus* group (compressed abdomen and chloropid hosts), they are excluded from the *Coelininus* group at the present time.

I follow Griffiths (1964) rather than Riegel (1982), Maetô (1983a, 1983b), and Tobias (1986) in treating *Lepton* and *Polemochartus* under *Coelininus*. Arguments for this arrangement were made by Griffiths (1964) and Wharton and Austin (1991), but do not preclude the eventual recognition of either of these once the *Coelininus* group has been more thoroughly studied. *Sarops*, correctly placed by Riegel (1982) and Maetô (1983a) in the *Coelininus* group, also appears to lack apomorphic traits relative to *Coelininus*, and has been defined almost exclusively on the basis of its broad first tergum (Riegel 1982, Maetô 1983a). Using *Laotris* and *Synelix* as outgroups, the broad first tergum with dorsope is plesiomorphic and *Sarops* should therefore also be treated under *Coelininus* s. l. The generic concepts are briefly reviewed below.

The four described species of *Polemochartus* are clearly defined as a monophyletic unit by the possession of spatulate tar-

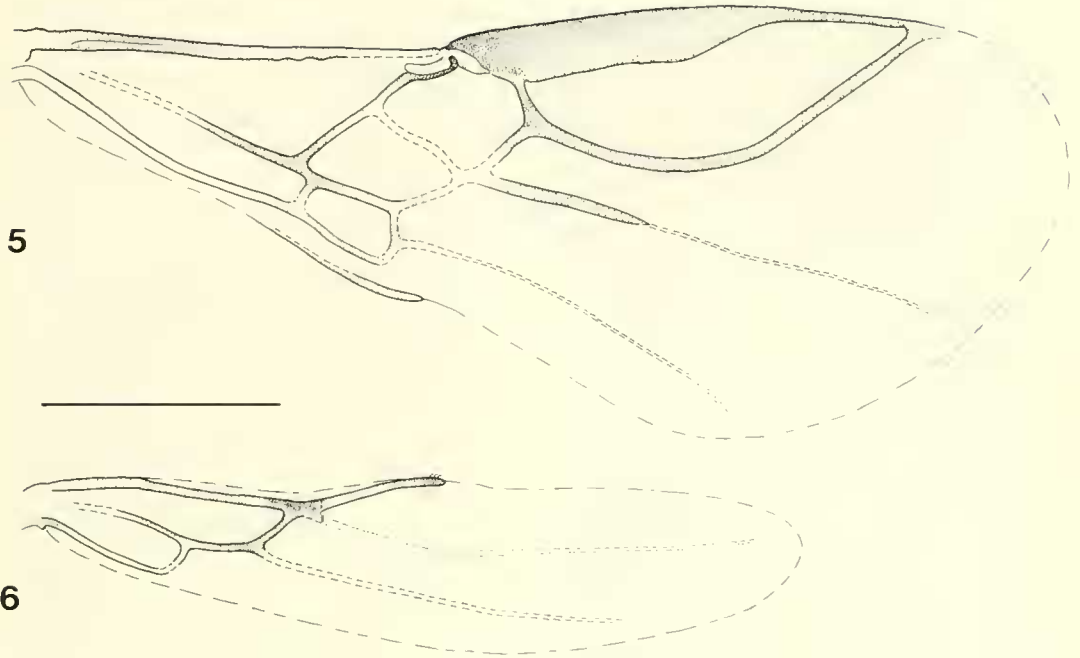


Figs. 1-4. *Epimicta griffithsi*. 1. Frontal view of head, antennae removed. 2. Left mandible, arrow pointing to fourth tooth. 3. Left side of mesosoma, arrow pointing to metanotal flange. 4. Anterior portion of metasoma showing sculptured petiole and striate T2. Scale bars = 100 μ m.

sal claws (Maetô 1983b, Figs. 26-28). *Coelinus* s. s., *Polemochartus*, and *Sarops* retain the plesiomorphic states of a more or less sinuate radial sector in the fore wing and a pit-like dorsope on the petiole, whereas in *Lepton* the pit is usually lost and the radial sector tends to be shorter and more evenly curved. The vast majority of the species with the *Coelninius* group fall within this concept of *Lepton* (= *Coelinidea*). *Coelinus parvulus* (Nees), a senior synonym of *C. anceps* (Curtis), is the only species currently included in *Coelinus* s. s. (Griffiths 1964, Wharton and Austin 1991). It appears to lack uniquely derived character states relative to *Lepton* and *Polemochartus*, making it difficult to retain the latter two as valid genera. The blade-like abdomen of *parvulus*, for example, is also found in *Sarops rea*

Nixon and some species of *Lepton*, and the shorter, broader mandible (Wharton and Austin 1991, Figs. 11, 12) has been treated as a plesiomorphic feature relative to the condition in *Lepton* (Griffiths 1964).

Examination of the large number of described and undescribed species of *Coelinus* s. l. housed primarily in CNC, AEI and TAMU has clearly shown that there is a transition in character states involving the petiole (dorsope and shape), clypeus (degree of protrusion), radial sector (evenly curved to weakly sinuate), gaster (blade-like compression, sculpture, setae, and notches) and mandible (development of the 4th tooth) within the *Coelinus* group. This variation is the major factor preventing clear-cut segregation of *Lepton* and *Sarops* from *Coelinus* s.s.



Figs. 5, 6. *Epimicta griffithsi*. 5. Fore wing. 6. Hind wing. Scale bar = 0.48 mm.

Genus *Epimicta* Foerster

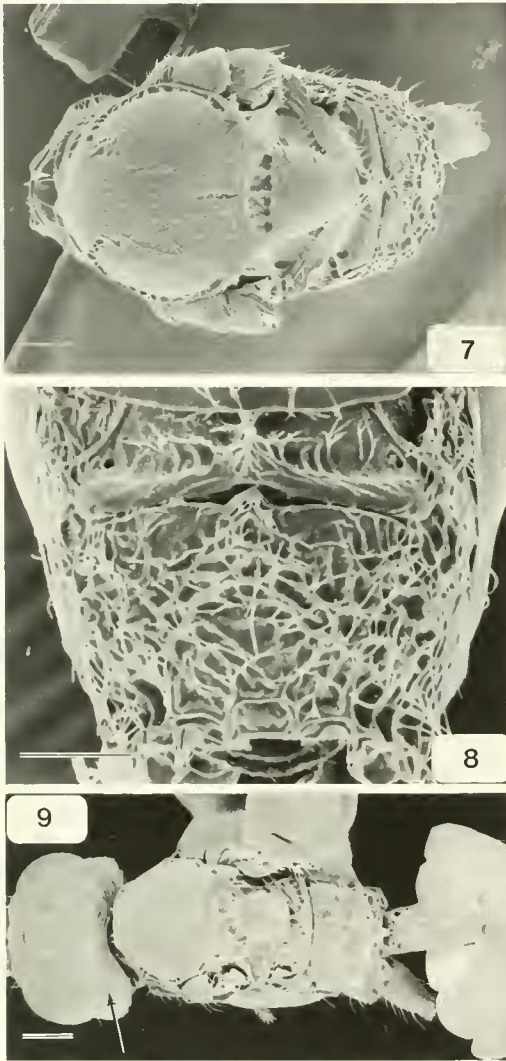
Epimicta Foerster, 1862: 274. Type species: *Alysia (Dacnusa) marginalis* Haliday (monobasic and original designation).

As noted by Nixon (1943), Griffiths (1964), and Riegel (1982) *Epimicta* is close to *Symphya*. The combination of enlarged, 4-toothed mandible (with the additional 4th tooth located along ventral margin of mandible: Fig. 2, arrow), densely striate T2 (Fig. 4), and flange-like median spine of the metanotum (Fig. 3) support the hypothesis of a sister-group relationship between these two. *Epimicta* presently contains a single Palaearctic species. A second species, *rossica* Telenga, was transferred by Tobias (1986) to *Synelix*. The species described here, while distinctly different from *E. marginalis*, nonetheless fits *Epimicta* on the basis of the mandibular morphology, the well-developed metanotal flange, and T2 sculpture. If the larger metanotal spine and more completely carapace-like metasoma of *Symphya*

are derived from the conditions in *Epimicta*, then it becomes difficult to retain the latter as monophyletic (Griffiths 1964). *Epimicta* is retained here pending more detailed assessment of the shape of mandibular tooth 3.

Epimicta griffithsi Wharton,
NEW SPECIES
(Figs. 1-8)

Description.—♀ *Head*: 1.4–1.6 (\bar{m} = 1.55) × wider than long, temples distinctly bulging behind eyes in dorsal view. Face (Fig. 1) finely punctate, weakly wrinkled, short, with eyes weakly converging below, 1.5–1.7 (\bar{m} = 1.6) × wider than high. Frons (Fig. 1) usually (90%) with small rugose spot medially at base, otherwise smooth, polished; bare medially, with a band of short, closely spaced setae along inner margin of eye. Mandible (Fig. 2) 0.95–1.15 (\bar{m} = 1.1) × longer than width between tooth 1 and 3, distinctly expanded apically, with apical width about 1.35 × basal width; surface ru-



Figs. 7-9. 7, 8: *Epimicta griffithsi*, 9: *Aphaereta confusa*. 7, Dorsal view of mesosoma. 8, Propodeum. 9, Dorsal view of body, arrow pointing to striae on occiput. Scale bars = 100 μ m.

gose; tooth 1 rounded or quadrangular, depending on angle of view, with strong diagonal ridge; tooth 3 large, orthogonal; tooth 2 nearly an equilateral triangle, without dorsal knob, more widely separated from tooth 3 than tooth 1; diagonal ridge poorly developed relative to ridge on tooth 1. Malar space absent. Eye 1.15-1.6 (\bar{m} = 1.35) \times

longer than temple; virtually bare, setae present (Fig. 2), but not visible in dorsal view at 50 \times . Antenna as long as body, 23-26 segmented; first flagellomere 1.05-1.15 (\bar{m} = 1.1) \times longer than second; flagellar setae short and decumbent throughout. *Mesosoma*: 1.3-1.4 (\bar{m} = 1.35) \times higher than wide; 1.25-1.35 (\bar{m} = 1.3) \times longer than high. Pronotum (Figs. 3, 7) with large median pit containing median longitudinal groove anteriorly; posterior margin with shallow, weakly crenulate, transverse grooves delineated anteriorly by low transverse ridges on either side of midpit. Mesonotum (Figs. 3, 7) rounded anteriorly, anterior declivity steep, densely covered with decumbent setae; notauli (Fig. 7) deep, crenulate, continuous with crenulate anterior-lateral margin, but short, ending on disk far anterior deep, slit-like, crenulate midpit; median and lateral mesonotal lobes covered with setae (Fig. 7), these decreasing slightly in density posterior-laterally. Prescutellar pit (Fig. 7) broad, bearing 3 longitudinal ridges; scutellum bare medially, densely setose and usually finely rugulose apically. Metanotum with elevated median carina (Fig. 3, arrow); weakly crenulate laterally. Propodeum (Fig. 8) rugose throughout. Pronotum laterally (Fig. 3) unsculptured, polished and bare medially; usually with anterior and posterior margins crenulate. Mesopleuron polished and bare medially, crenulate along anterior margin, the sculpture sometimes extending onto anterior portion of subalar region, posterior margin smooth, lacking crenulae; sternaulus (Fig. 3) complete, broader anteriorly, largely crenulate to crenulate-rugose, the sculpture often absent or nearly so ventrad speculum. Metapleuron (Fig. 3) rugose to crenulate-rugose around margin, with large, flat, nearly smooth median plate. *Wings* (Figs. 5, 6): fore wing stigma narrow, parallel-sided for most of its length, tapering gradually into R1 over apical 0.2, 6-7 \times longer than wide; r arising from basal 0.2; 2-RS evenly curved

towards anterior margin, very weakly sinuate, ending on wing margin equidistant between stigma and a line tangent to apex of wing; RS + Mb highly variable in length, but m-cu never interstitial; cell 2CU broadening distally, about $2\times$ longer than height at distal end. Hind wing with M + CU variable, $2.2\text{--}2.8$ ($\bar{m} = 2.55$) \times longer than 1-M; RS and 2-M spectral; m-cu absent. *Metasoma* (Fig. 4); petiole $1.1\text{--}1.3$ ($\bar{m} = 1.2$) \times longer than apical width, wider at apex than at base; surface rugose; dorsal carinae short, converging to form an acute angle at level of spiracles, but not continuing posteriorly; dorsope deep. T2 densely and uniformly striate; T3 with scattered setae medially, otherwise polished, unsculptured; T4 and following with setae confined to posterior margin. Ovipositor very short, about $0.2\times$ length of mesosoma, very slender, needle-like, without apparent teeth at apex. *Color*: black; antenna and T2 dark brown; T3 and following, most of sterna, hind tibia and tarsi, and ovipositor sheath brown; pedicel and mandible dark yellow to yellow-brown, scape usually lighter; labrum, coxae, trochanters, femora, fore and middle tibia and most of tarsi yellow; palps pale yellow; wings hyaline. *Body length*: $1.9\text{--}2.4$ mm.

δ : about as in female except for petiole, which is slightly longer ($1.2\text{--}1.4\times$ longer than apical width).

Material examined.—Holotype \varnothing : USA, "TEXAS: Bosque Co. 3 mi. W. Laguna Park 13 April 1984 R. Wharton, J. Woolley" (USNM). Paratypes: 5 \varnothing , 1 δ , same date as holotype (CNC, TAMU); 1 \varnothing , same data but J. B. Woolley, collector; 1 δ , Texas, Brazos Co., College Station, March 13–18, 1982, R. Wharton, M. Hrnair, pan traps (TAMU); 1 δ , same locality, March 8–31, 1991, R. Wharton (TAMU).

Diagnosis.—This is a smaller, less heavily sculptured species than the Palearctic *E. marginalis*. The latter has the subalar region more extensively rugose, the posterior margin of the mesopleuron crenulate, and the

notauli extending to or nearly to the posterior margin of the mesonotal disk. Additionally, the head is more transverse in *marginalis*, the pronope smaller, and fore wing vein 2-RS extends further towards the wing tip.

Discussion.—This is the first record of *Epimicta* from the New World. The needle-like ovipositor suggests the possibility that this species oviposits in host eggs. A similar phenomenon has been well documented for the opiine braconid *Fopius arisanus* (Sonan) (van den Bosch and Haramoto 1951). The host of *E. griffithsi*, however, is unknown. The species is named for Graham C. D. Griffiths, for his many significant contributions to our knowledge of Palearctic Dacnusiini.

Genus *Laotris* Nixon

Laotris Nixon, 1943: 30. Type species: *Alysia* (*Dacnusa*) *striatula* Haliday (monobasic and original designation).

The genus *Laotris* contains two species from the Palearctic region (Shenefelt 1974). It is represented in North America by at least two species. I have examined three specimens from Colorado (CNC, TAMU), one from British Columbia (CNC), and one from Yukon Territory (CNC). The Nearctic species have mandibles identical to that of the type species (Nixon 1943, Fig. 26), and all of the species have an additional tooth between tooth 1 and tooth 2 (Fig. 11). The abdomen is short, dorsal-ventrally depressed, and has T2 extensively striate. The North American specimens appear to represent two different species, but are not described here pending collection of additional material.

Laotris is very similar to *Synelix*, but retains 2cu-a in the fore wing and has a narrow mandible which lacks the additional tooth between tooth 2 and 3 (compare Figs. 10 and 11). *Laotris* thus appears to lack apomorphic features relative to *Synelix*, and

may eventually have to be treated as a synonym of the latter. I am reluctant to propose this synonymy, however, since specimens have heretofore been rare, and thus the species have not received sufficiently detailed scrutiny.

Genus *Synelix* Foerster

Synelix Foerster, 1862: 276. Type species: *Synelix agnata* Foerster (monobasic and original designation).

Wharton (in Marsh et al. 1987, Fig. 24) incorrectly used the name *Ectilis* for an Holarctic dacusine represented in the New World by specimens from Alaska, Michigan, and across Canada from Yukon Territory to Labrador. These specimens are conspecific with *semirugosa* Haliday, and the correct combination for the New World species should be *Synelix semirugosa* since *Ectilis* is a junior subjective synonym of *Synelix* (Griffiths 1964). I have examined the type material of *Synelix agnata* Foerster in Berlin and *Alysia semirugosa* Haliday in Dublin and confirm this synonymy. See above under *Laotris* for diagnostic features of *Synelix*. Griffiths (1964) also treated *Sarops* as a synonym of *Synelix*, thus leading him to describe the metasoma of *Synelix* as compressed. I consider the differences in the mandible and shape of the abdomen to be sufficiently distinct to retain *Sarops* separate from *Synelix* (see the excellent discussion by Mactô (1983a) and the discussion of *Coelinus* above). Abdominal compression can be treated as a synapomorph for *Sarops* (= *Coelinus*) and the additional mandibular tooth as a potential apomorphic trait defining *Synelix*.

I interpret *semirugosa* as a highly variable species. Observable differences in sculpture (pattern and degree), leg and stigma color and mandible width are considerable, but do not show consistent patterns from one specimen to the next, even within localities. Further study of longer series from single localities is warranted.

Tribe Alysini

Genus *Aphaereta* Foerster

Aphaereta Foerster, 1862: 264. Type species: *Alysia cephalotes* Haliday (monobasic and original designation).

Trisynaldis Fischer, 1958: 13. Type species: *Trisynaldis conflucta* Fischer (monobasic and original designation). **New Synonym.**

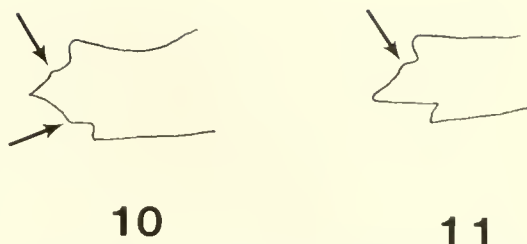
A complete generic synonymy can be found in Shenefelt (1974). Wharton (1977) revised the New World species, and discussed character states useful for delineating species groups. Wharton (1980) also noted that *Trisynaldis* was closely related to *Aphaereta*, and might have to be treated as a synonym of the latter with further study. Several New World species of *Aphaereta* with a *Trisynaldis* wing vein pattern have recently been discovered, confirming the suspicion that this venation pattern is insufficient for recognizing *Trisynaldis* as a separate genus. A new species group is defined below to include these New World species, separate from the Old World *T. conflucta*. The above synonymy was proposed by Munk (T. Munk, in litt.) based on his work with *conflucta*, and should be attributed to him.

APHAERETA CONFUSA SPECIES GROUP

Description.—*Head*: mandible (Fig. 12) parallel-sided or narrowing slightly from base to apex, with 3 well-developed teeth; tooth 1 and 3 similar in size and shape; tooth 2 separated by deep cleft from tooth 1, distinctly protruding beyond tooth 1 and 3, without dorsal node; diagonal ridge distinct. Antenna (Fig. 13) with individual flagellomeres much longer than wide in both sexes; first flagellomere subequal to or longer than second. Eye-antennal sulcus absent. Clypeus (Fig. 14) of moderate size, weakly convex, never strongly protruding, hemispherical in outline. Epistomal sulcus narrow, shallow to moderately deep. Malar space not or only very weakly developed. Maxillary palp 6 segmented, labial palp 3

segmented. *Mesosoma*: pronotum dorsally with flat, median plate and subpronope-like pits dorsal-laterally. Mesonotum (Fig. 9) with anterior-lateral margin variable, from crenulate to unsculptured; anterior declivity delimited dorsally by transverse ridges extending mesally from lateral margins. Propodeum usually with narrow areola posteriorly, this rarely replaced by median ridge. *Wings* (Figs. 16, 17): fore wing stigma linear, virtually indistinguishable from metacarpus; cells 1M, 1R1, and 1 + 2RS confluent, veins RS + Ma and 1-RSb absent; 3-M extending at least half way to wing margin, and often nearly reaching wing margin (Fig. 16); cell 2CU open, 2-1A and 2cu-a absent. Hind wing with m-cu, 1-1A, and 1-CU absent. Known from Brasil, Colombia, Dominican Republic, Ecuador, and Mexico.

Diagnosis.—This species group is characterized by the loss of fore wing veins RS + Ma and 1-RSb, resulting in a single large cell representing the discal and first two submarginal cells. Members of this group resemble the Palearctic *Trisynaldis conflucta* Fischer in this regard, but the latter more closely resembles *Aphaereta minuta* Nees and other members of the *Aphaereta palipes* group in the loss of the apical portion of hind wing vein M + CU & 1-M and in the relative proportions of the first two flagellomeres. *Aphaereta confusa* n. sp. and related species have exceptionally long first flagellomeres, a character not shared by other species of *Aphaereta*. In fact, the hypothesized reversal to the plesiomorphic state in this character makes it difficult to recognize these species as members of the *Phaenocarpa* complex (Wharton 1980) to which *Aphaereta* belongs. Additionally, all males which I have examined have the maxilla distinctly inflated, almost balloon-like; and the petiole in nearly all species is longer and narrower than is typical for *Aphaereta*. Nevertheless, on the basis of a single, somewhat transitional specimen from Ecuador (CNC), in which the first flagellomere is slighter

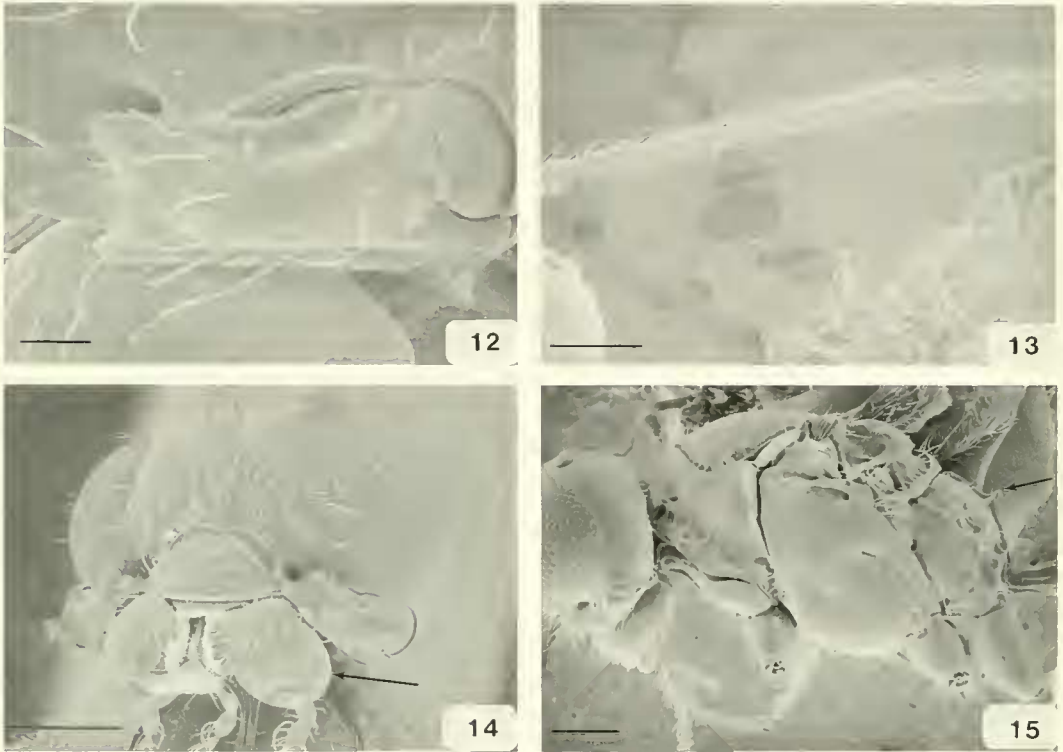


Figs. 10, 11. Mandibles. 10, *Synelix semirugosa*. 11, *Laotris* sp. Arrows pointing to additional teeth between tooth 1 and 2 and between tooth 3 and 4.

shorter than the second and the petiole is broader, 1 place *confusa* and related species in *Aphaereta*. The shape of the long ovipositor (with subapical dorsal node), the narrow propodeal areola, the fore wing with linear stigma and open cell 2CU, reduced hind wing venation, and general shape of head and mandibles help to confirm this placement.

Aphaereta confusa Wharton,
NEW SPECIES
(Figs. 9, 12–17)

Description.—♂ *Head*: moderately transverse in dorsal view, 1.4–1.5 (\bar{m} = 1.45)× wider than long. Face (Fig. 14) smooth, polished, 1.05–1.2 (\bar{m} = 1.1)× wider than high. Frons smooth, polished, essentially bare. Occiput (Fig. 9) with strigose patch on either side of midline. Mandible (Fig. 12) about 2.0–2.5× longer than apical width; slightly widened at base; smooth; tooth 1 larger than tooth 3. Eye variable, 1.9–2.7 (\bar{m} = 2.4)× longer than temple; with 2–5 short setae usually visible in dorsal view. Antenna (Fig. 13) roughly 1.75× body length; 16 segmented; first flagellomere 1.05–1.15 (\bar{m} = 1.1)× longer than second; 1.15–1.25 (\bar{m} = 1.2)× longer than third. Maxillary palp slightly longer than height of head; maxilla enormously swollen (Fig. 14). *Mesosoma*: about 1.4× higher than wide; 1.3–1.4× longer than high. Mesonotum (Fig. 9) with anterior-lateral margin unsculptured to weakly crenulate in larger specimens; anterior declivity steep, reflect-

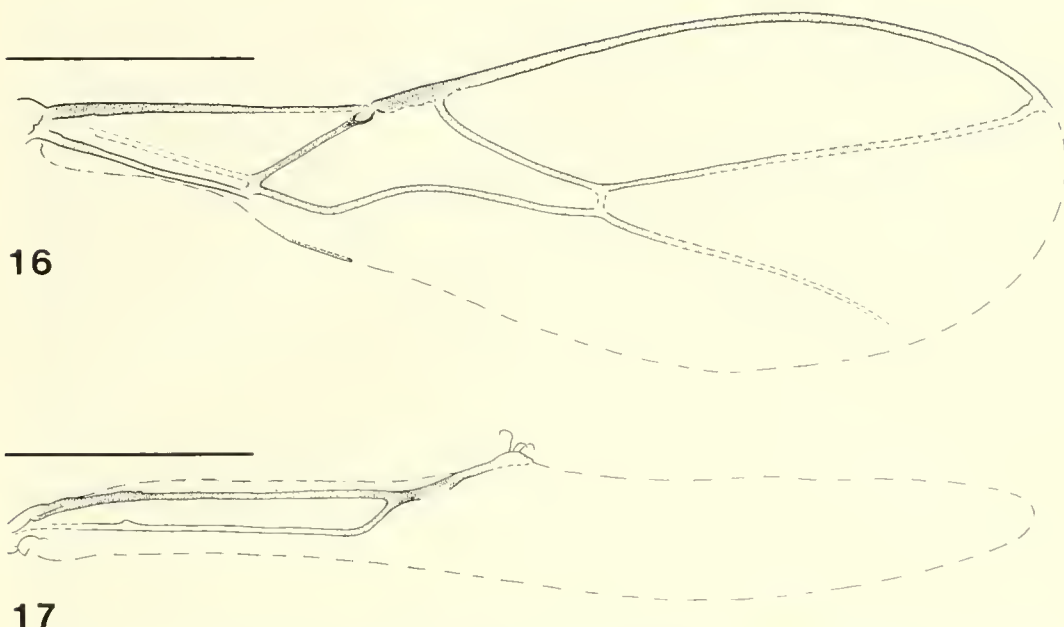


Figs. 12-15. *Aphaereta confusa*. 12, Left mandible; scale bar = 20 μm . 13, Right antenna, medial view; scale bar = 100 μm . 14, Face showing enlarged maxilla (arrow); scale bar = 100 μm . 15, Mesosoma, left side, showing median propodeal spine (arrow); scale bar = 100 μm .

ed such that dorsal margin usually protrudes anteriorly more than ventral margin; disk bare, without midpit, with a few scattered setae along lateral margin and along transverse ridge delimiting anterior declivity. Prescutellar pit broad (Fig. 9), with single median carina. Metanotum medially (Fig. 9) dominated by flat, polished, largely triangular boss. Propodeum with narrow areola on posterior half, varying in shape from triangular to rectangular (as in Fig. 9); median longitudinal carina present on anterior half, forming a low but distinct spine (Fig. 15) at junction with areola; transverse carina complete. Posterior margin of mesopleuron unsculptured; sternaulus (Fig. 15) very short, crenulate. Metapleuron (Fig. 15) almost entirely unsculptured. *Wings* (Fig. 16, 17): combined fore wing vein r & 2-RSa varying from strongly to weakly curved,

variable in length, but less than twice length of 1-M; M + CU unpigmented except at extreme distal end. Hind wing M + CU & 1-M nearly half length of remainder of wing. *Metasoma*: petiole (Fig. 9) 1.9-2.2 (\bar{n} = 2.0) \times longer than apical width; nearly parallel-sided, apex about 1.1-1.3 \times wider than base; surface rugose, largely obscuring dorsal carinae, which are generally discernible only on basal half; dorsope small, deep, visible in posterior view. *Color*: brown; clypeus, T2 + 3, and most of antenna usually light brown; basal 2-3 flagellomeres, at least ventrally, yellowish, gradually darkening distally; scape, pedicel, mandible, and legs (including all coxae) yellow; palps white. *Body length*: 1.3-1.6 mm.

♀: similar to male but without enlarged maxilla. Antenna slightly shorter relative to body due to shorter basal flagellomeres.



Figs. 16, 17. *Aphaereta confusa*. 16, Fore wing; scale bar = 0.48 mm. 17, Hind wing; scale bar = 0.3 mm.

Ovipositor with dorsal, subapical notch and elongate node; ovipositor sheath about as long as mesosoma, slightly expanded distally, with setae on distal 0.25 about twice density of that on basal 0.75.

Biology: unknown.

Material examined.—Holotype ♂: "MEXICO: Puebla 4.7 mi SW La Cumbre VII-23-1987 5100 ft R. Wharton" (USNM). Paratypes: 1 ♀, 5 ♂, same data as holotype (TAMU, CNC, RMNH); 1 ♂, same except collected by Woolley and Zolnerowich (TAMU).

Diagnosis.—This species is characterized by the shape (Fig. 9) and rugose sculpture of the petiole, the sculptured occiput, and the dark body. The six undescribed species I have seen from Brasil, Colombia, Dominican Republic, and Ecuador (CNC, TAMU) all have a smooth, polished occiput. Additional undescribed species from Mexico, nearly all of which have a sculptured occiput, differ from *confusa* primarily by their reduced petiolar sculpture and longer, more distinct dorsal carinae.

Discussion.—I have defined the *confusa* species group broadly to include species with a *Trisynaldis*-like venation pattern and relatively long first flagellomere (as opposed to *T. conflucta*, defined by the loss of the apical portion of hind wing M + CU & 1-M). It may be possible to split the New World species further into those which have a sculptured occiput (typical of *confusa*) and those which do not. The latter may be defined as monophyletic on the basis of their white apical or subapical flagellomeres. Males with swollen maxillae are presently known only from Mexico. This character state is found only in those species which have a sculptured occiput, and could possibly be confined to these species. Available material from other countries, however, is represented only by females. I have used a male as holotype because of the importance of the maxillary character.

The species name refers to the long first flagellomere and pattern of wing loss which obscure the association with other species of *Aphaereta*.

Genus *Apronopa* Achterberg

Apronopa Achterberg, 1980: 75. Type species: *Apronopa haeselbarthi* Achterberg (monobasic and original designation).

Apronopa was described by Achterberg (1980) for a single species from Germany, characterized by *Aspilota*-like wing venation and a striate second metasomal tergum. *Apronopa* also occurs in the Nearctic Region and is recorded here for the first time. I have seen several specimens of an undescribed species from Colorado (CNC, TAMU). The new species will be described by T. Munk (T. Munk, pers. comm.). *Apronopa* could be included in the *Aspilota* complex of genera (Achterberg 1988) on the basis of the strongly postfurcal fore wing m-cu and the reduced mandibles. However, it differs from other members of this complex by the presence of sculpture on T2. The Nearctic *Symphanes myxa* Wharton is very similar in overall appearance, but retains an enlarged fore wing stigma. If further study shows *myxa* to be the sister-group of *Apronopa*, then the venation pattern in *Apronopa* must be interpreted as convergent with that in *Aspilota*.

Genus *Asobara* Foerster

Asobara Foerster, 1862: 267. Type species: *Alysia tabida* Nees von Esenbeck (monobasic and original designation).

Asobara consists primarily of small drosophilid parasitoids (Vet et al. 1984). The genus is particularly diverse in the Old World tropics, where most of the species are undescribed. A group of Neotropical species, exemplified by *Asobara anastrephae* (Muesebeck) and *A. rubra* (Papp), has diversified onto larger hosts, primarily tephritids, and this host switch has been accompanied by some morphological changes. These species are larger, more brightly colored, and have lost the hind wing vein 1-CU (Muesebeck 1958, Wharton 1980). Wharton (1980) suggested that their placement in *Asobara* may be misleading, but analysis of

much additional material from more recent collections (notably those housed in AEI and TAMU) does not support this suggestion. Some of the smaller Neotropical *Asobara* species have also lost the hind wing 1-CU, and the otherwise identical pattern of wing venation suggests that these larger species are derived from the smaller drosophilid parasitoids rather than from a different group within *Phaenocarpa* Foerster s. l. (see discussion of *Phaenocarpa* below). This would simply involve a host switch within the same microhabitat (fruit), and possibly a slight temporal displacement since tephritid hosts completing their development often exit the fruit around the time it is suitably decomposed for drosophilid development.

Genus *Aspilota* Foerster

Aspilota Foerster, 1862: 268. Type species: *Alysia ruficornis* Nees von Esenbeck (monobasic and original designation).

An excellent discussion of this group has been provided by Achterberg (1988), who divides the *Aspilota* complex into two large genera, *Aspilota* and *Dinotrema* Foerster, and several smaller ones. An alternative viewpoint is provided by Wharton (1985), who points to the difficulty of defining *Dinotrema* as monophyletic. Complete synonymies are provided by Achterberg (1988).

Several species with *Prosapha*-like wing venation, not previously described from the New World, are recorded here for the first time. Fischer (1971) and Wharton (1980) noted the relationship between *Prosapha* Foerster and *Aspilota* s. l., and Achterberg (1988) correctly placed *Prosapha* within the *Aspilota* group as a synonym of *Dinotrema*. *Prosapha* had previously been maintained as a separate genus due to overemphasis on the enlarged stigma of the male of the only included species, *Aspilota speculum* (Haliday). An enlarged stigma is now known for males of several other members of the *Aspilota* group. The type species of *Prosapha* is characterized by a relatively wide man-

dible, areolate propodeum, and relatively large anterior tentorial pit (Achterberg 1988). Two similar species occur in the New World: one in Texas and one in Mexico (TAMU). Two additional species with a secondarily enlarged fore wing stigma, but belonging to different species groups (with only a median longitudinal carina on the propodeum) are known from Brasil (CNC) and Mexico (TAMU). Since none of these species is represented by both sexes or by more than two specimens, they are not described here.

Dapsildiastema Wharton, NEW GENUS

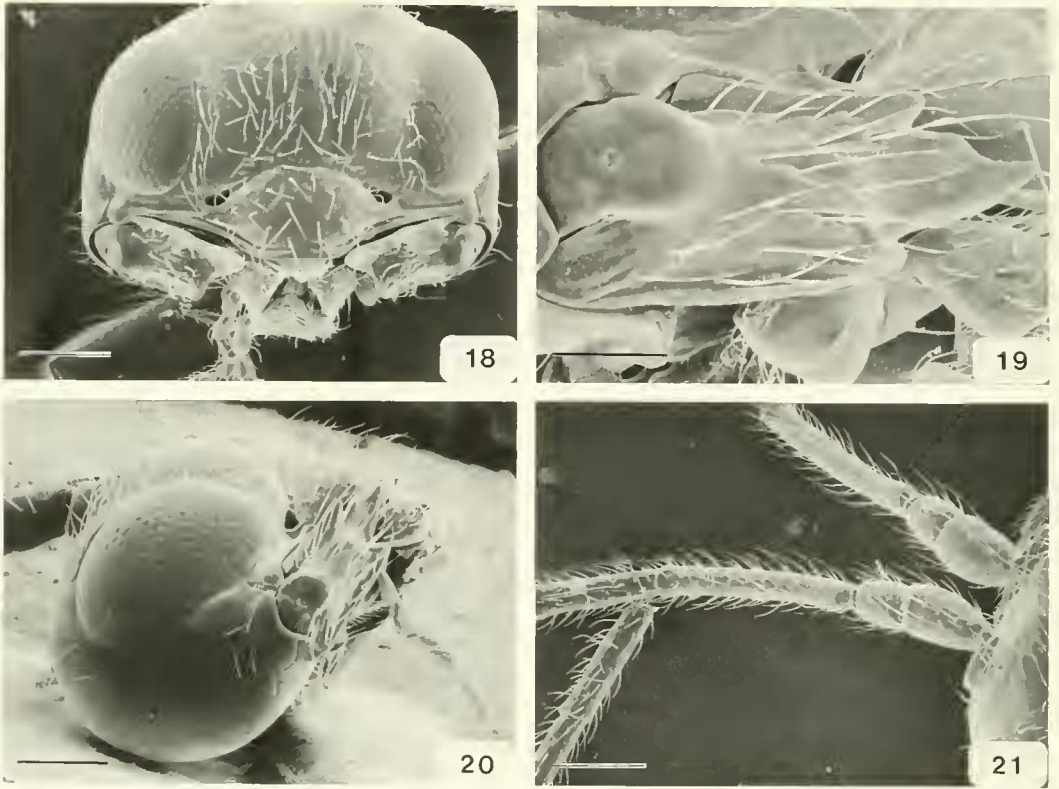
Type species: Dapsildiastema angusta, new species.

Description.—*Head:* mandible with 3 well-developed teeth; tooth 2 separated by distinct cleft from tooth 1; diagonal ridge present or absent; ventral margin of mandible carinate. Antenna (Fig. 21) with first flagellomere longer than second. Clypeus (Fig. 18) large, convex, broadly elliptical in outline. Epistomal sulcus narrow, moderately deep. Malar space not developed. Maxillary palp 6 segmented; labial palp 4 segmented. *Mesosoma:* pronotum dorsally with or without median pit. Mesonotum (Fig. 25) with anterior-lateral margin variable, from crenulate to unsculptured; anterior declivity delimited dorsally by transverse ridges extending mesally from lateral margins. Scutellum weakly convex, without posterior spine. Metanotum without tall flange or spine. Propodeal sculpture variable. Sternaulus shallowly to deeply impressed, smooth or very weakly sculptured. *Wings:* fore wing with radial cross-vein (r) arising basad discrete stigma; stigma varying from long and narrow to secondarily thickened; 2-RSa longer than 1-RSb; m-cu variable in insertion between first and second submarginal cell; cell 2CU broadly opened posterior-distally; 2cu-a weak to nearly absent, 2-CUa well developed and more or less posteriorly directed. 2-CUb thus arising from middle of distal margin of cell 2CU. Hind wing with m-cu absent; M +

CU not unusually short; 3 hamuli. *Metasoma:* not laterally compressed; petiole with deep dorsope; tergum 2 usually striate, at least at extreme base. Ovipositor very short, barely exerted. Known only from Chile and an adjacent, Andean region of Argentina.

Diagnosis.—Members of this genus are characterized by the large, broadly elliptical clypeus, elongate and sometimes secondarily thickened fore wing stigma, open subdiscal cell, and absence of hind wing vein m-cu. The type species is most similar in overall appearance to the species of *Trachyusa*, but this and other species of *Dapsildiastema* also share some traits in common with *Dapsilarthra*. For example, the ovipositor is barely exerted, and the hind wing m-cu has been lost in all three genera. The appearance of the open subdiscal cell of *Dapsildiastema*, however, more closely resembles the condition in *Trachyusa* than that in *Dapsilarthra*. The shape of the clypeus and petiole in *Dapsildiastema* is also quite similar to that in *Trachyusa*, and these two character states are potential synapomorphies for the two genera. In *Dapsilarthra*, the petiole is rarely parallel-sided and densely striate, and the clypeus, when not short and protruding, usually has a concave ventral margin. The anterior declivity of the mesonotum is also similarly carinately margined in *Trachyusa* and *Dapsildiastema*. The metasoma is much more extensively sculptured in *Trachyusa*, however, and the sculpture is granular. Additionally, the sternaulus and notauli are better developed in *Trachyusa* and the second submarginal cell and fore wing stigma retain a more plesiomorphic shape.

Discussion.—The relationships of *Trachyusa* to other Alysiini has been difficult to discern (Wharton 1980). (See Achterberg and O'Connor (1990) for latest revision of the species.) The admittedly heterogeneous assemblage treated here under *Dapsildiastema* appears to bridge the gap somewhat between *Trachyusa* and other Alysiini (most specifically *Dapsilarthra*).



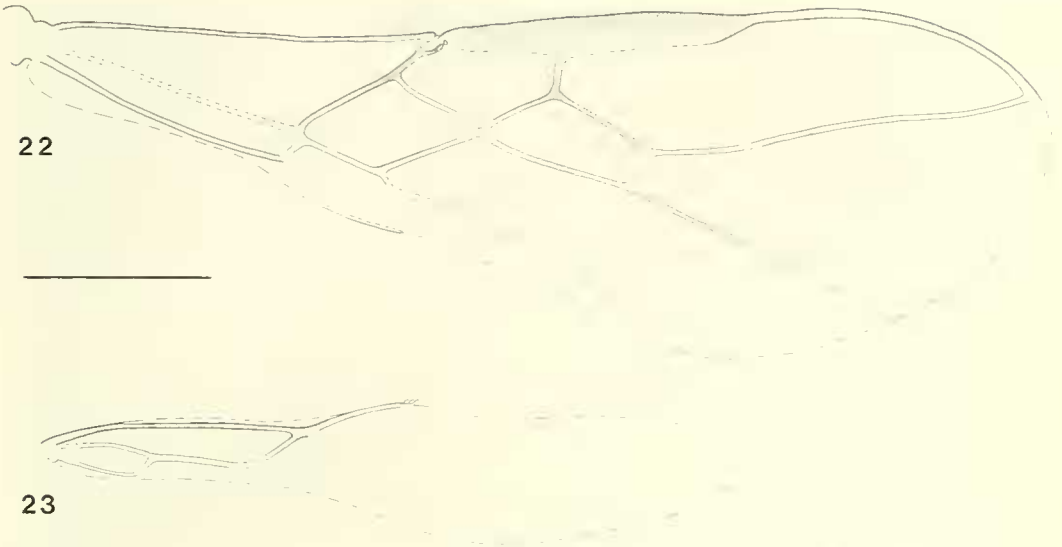
Figs. 18–21. *Dapsildiastema angusta*. 18, Face; scale bar = 100 μm . 19, Right mandible; scale bar = 50 μm . 20, Lateral view of head; scale bar = 100 μm . 21, Scape, pedicel, and basal flagellomeres; scale bar = 100 μm .

Dapsildiastema angusta is very *Trachyusa*-like in shape and mesosomal sculpture. Other species of *Dapsildiastema*, however, are much less so. Mandibles, pronotum, propodeum and T2 sculpture are unusually variable in *Dapsildiastema*, and this variation could be used to justify the establishment of several additional genera. I prefer to retain these seemingly disparate species in a single genus however, to better reflect the hypothesis of a transitional group having affinities with both *Trachyusa* and *Dapsilarthra*. I use the shape of the clypeus and loss of certain wing veins as synapomorphs to define this taxon. An alternative hypothesis is that these represent an aberrant group of *Dapsilarthra* with one highly derived species (*D. angusta* n. sp.) whose resemblance to *Trachyusa* is due entirely to convergence.

There is little in the way of distributional data to support the hypothesis of a relationship with either *Trachyusa* or *Dapsilarthra*. *Trachyusa* is confined to the Palearctic Region, and although I have seen one member of the *Dapsilarthra balteata* group from Costa Rica, neither *Trachyusa* nor *Dapsilarthra* is recorded from either South America or the Australia–New Zealand region. The name *Dapsildiastema* is feminine and means “ample interval,” in reference to its separation from both *Trachyusa* and *Dapsilarthra*.

Dapsildiastema angusta Wharton,
NEW SPECIES
(Figs. 18–27)

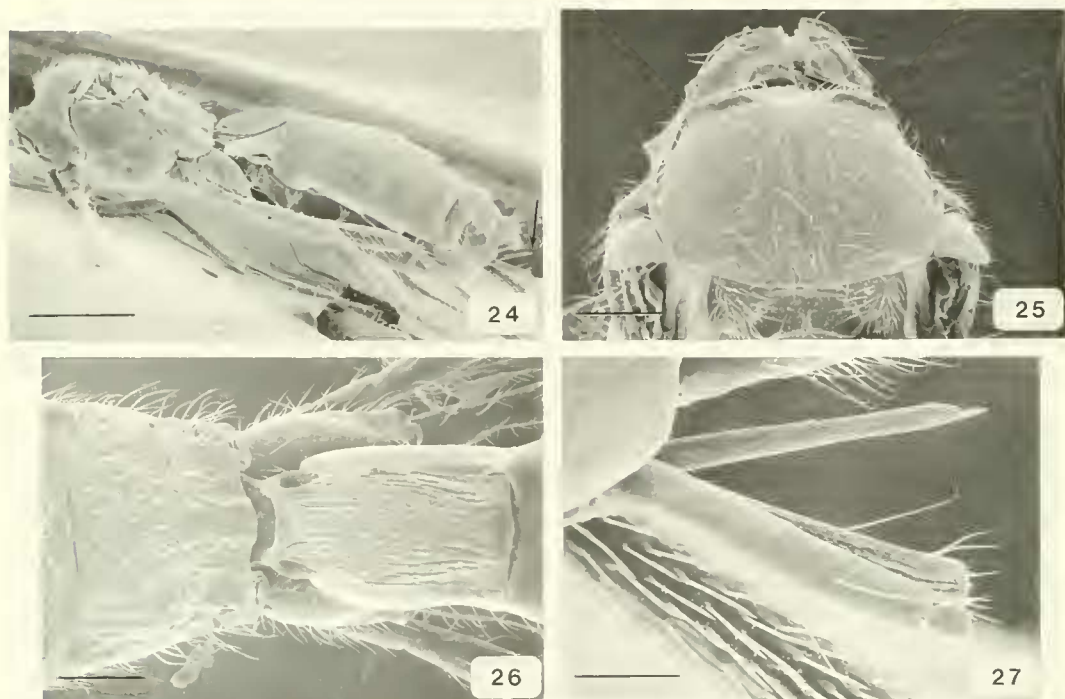
Description.—♀ *Head*: subcubical in dorsal view, 1.25–1.3 (\bar{m} = 1.25) \times wider



Figs. 22, 23. *Dapsildiastema angusta*. 22, Fore wing, 23, Hind wing. Scale bar = 0.48 mm.

than long. Face (Fig. 18) largely smooth and polished, with low, complete median ridge, often with weak, matt sculpture ventrally and/or alongside median ridge; $1.1\text{--}1.2\times$ wider than high. Frons smooth, polished, bare. Mandible (Fig. 19) about $1.6\text{--}2.0$ ($\bar{m} = 1.7$) \times longer than width between tooth 1 and 3; distinctly narrowed from base to apex, tooth 3 extending distad of tooth 1, both teeth small, acute; tooth 2 with well-developed dorsal knob; diagonal ridge well-developed from base to apex. Eye about equal in length to temple (Fig. 20); eyes distinctly converging ventrally, lacking obvious setae. Antenna (Fig. 21) 27–30 segmented; first flagellomere very long, $1.6\text{--}2.0$ ($\bar{m} = 1.8$) \times longer than second. Maxillary palp slightly longer than height of head. *Mesosoma*: $1.5\text{--}1.6\times$ higher than wide; $1.4\text{--}1.5\times$ longer than high. Pronotum dorsally (Fig. 25) moderately large, more than half length of second flagellomere; granular, without median pit with short, widely spaced longitudinal ridges along posterior margin. Mesonotal disk polished, covered medially with weakly curved, white setae (Fig. 25), largely bare laterally; anterior declivity steep, abrupt (Fig. 24); notauli absent, replaced by trans-

verse ridges at margin of anterior declivity; midpit long, narrow. Prescutellar pit with single median ridge which is better developed posteriorly. Metanotum with polished, triangular, posterior-median plate extending to anterior margin as low ridge; lateral fields finely sculptured to weakly crenulate. Propodeum (Fig. 26) extensively granular-rugulose; spiracle minute, placed slightly anterior middle of propodeum. Pronotum laterally with middle of anterior margin strongly produced as an acute tooth (Fig. 24); granular-rugulose anteriorly, median dorsal-ventral groove weak, often at least partly crenulate; surface largely smooth and polished posteriorly. Mesopleuron (Fig. 24) with posterior margin finely crenulate; sternaulus distinctly but somewhat irregularly impressed along its length, the depression often sharply margined in part, and rarely with trace of fine sculpture. Metapleuron with deep trough along ventral half of anterior margin; ventral flange distinct; surface moderately setose (Fig. 24), densely granular-rugulose ventrally. *Wings* (Figs. 22, 23): fore wing stigma long, narrow, but discrete distally, $8.0\text{--}9.3$ ($\bar{m} = 8.5$) \times longer than wide; r arising from basal $0.35\text{--}0.40$;



Figs. 24–27. *Dapsildiastema angusta*. 24, Left side of mesosoma and metasoma, including ovipositor (arrow); scale bar = 500 μm . 25, Dorsal view of mesonotum (pronotum broken); scale bar = 100 μm . 26, Dorsal view of propodeum (on the left) and petiole; scale bar = 100 μm . 27, Ovipositor and ovipositor sheaths; scale bar = 50 μm .

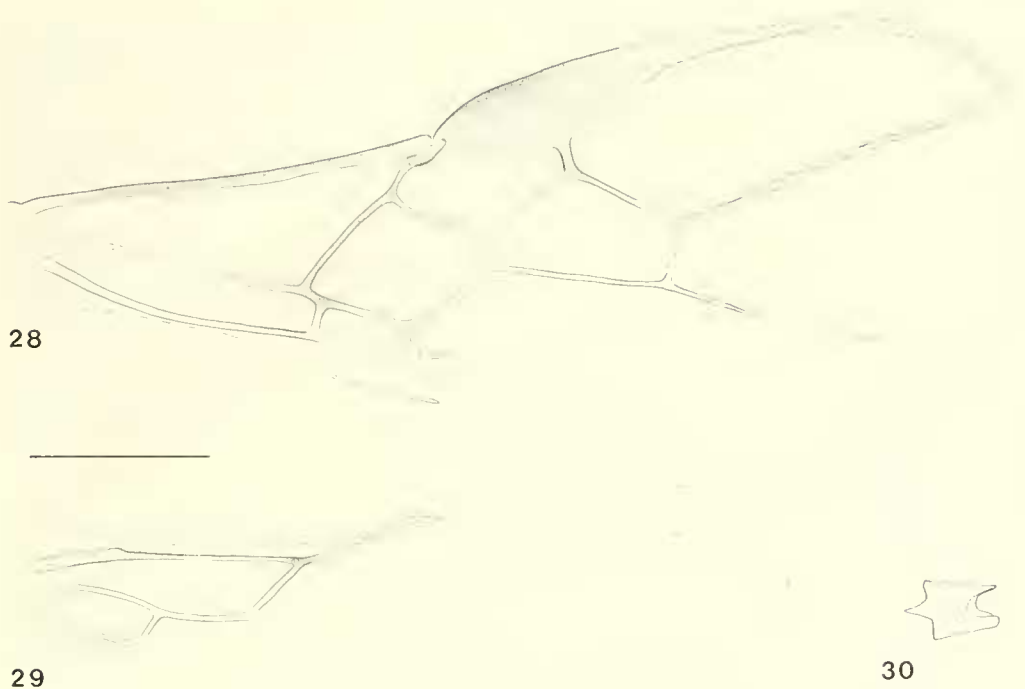
2-RSa 1.1–1.2 \times longer than 1-RSb, r about 0.4 \times length of 2-RSa; 2-RSb weakly curved, extending to wing tip; RS + Ma strongly sinuate; m-cu distinctly antefurcal; M + CU very weakly pigmented, largely spectral basally; 1cu-a postfurcal by less than its length; 2-1A absent distally, weakly pigmented and nebulous at extreme base; 2cu-a absent. Hind wing with M + CU 1.1–1.2 \times longer than 1-M. *Metasoma*: petiole (Fig. 26) about twice longer than wide, nearly parallel-sided, heavily and uniformly striate with complete basal transverse carina; dorsope small, deep; T2 with striae at extreme base. Ovipositor (Fig. 27) tapered from base to apex, with minute dorsal node. *Color*: brown to dark brown; mesonotal disk and usually most of rest of mesonotum yellow; pronotum dorsally, propleuron, mesopleuron ventrally, clypeus, mandible, scape, pedicel, median portion of metasoma dorsally, legs

except 5th tarsal segment and apex of hind tibia yellow; antenna yellow basally, gradually darkening apically; palps white; wings hyaline. *Body length*: 2.0–2.5 mm.

δ : as in female except antenna more uniformly brown and second submarginal cell slightly longer and narrower.

Material examined.—Holotype f "CHILE: Osorno Prov. Parque Nac. Puyehue, 4.1 Km E Anticura, 430m, 19–26.XII.1982 A. Newton and M. Thayer" (CNC). Paratypes: 1 f , ARGENTINA, Neuquén, Lago Lacar, Pucará, i-v.1969, C. Porter (AEI); 1 f , 2 δ same data as holotype (AEI, CNC); 5 f , 1 δ , same data except Antillanca road, 720–1000 m, 18–24.xii.1982 (CNC, TAMU); 20 f , 1 δ , CHILE, Pucatrihue, Coast Osorno, 28.i–5.ii.1978, 1–10.xi.1980 and 1–10.ii.1980, L. Peña (AEI, CNC, TAMU); 1 f , CHILE, Terao, 23.ii.1988, G. B. Edwards (AEI).

Diagnosis.—This species is readily iden-



Figs. 28–30. *Dapsildiastema crassa*. 28, Fore wing. 29, Hind wing. Scale (wings) = 0.48 mm. 30, Mandible.

tified by the narrow mandibles with well-developed dorsal knob on tooth 2.

Discussion.—The specimen from Argentina was collected just on the other side of the Andes from the Chilean localities. *Dapsildiastema* undoubtedly has a wider distribution in temperate South America than indicated by the limited material examined for this study.

It is difficult to measure alysiine mandibles accurately due to the twisting of the first and third teeth. Thus measurements given here and elsewhere are subject to considerable error and should be taken only as a relative indication of size. The species name refers to the relatively narrow mandible.

***Dapsildiastema crassa* Wharton,
NEW SPECIES
(Figs. 28–30)**

Description.—♂ *Head*: moderately transverse in dorsal view, about 1.5× wider than long. Face smooth, polished, with low,

complete median ridge, about 1.3× wider than high. Frons smooth, polished, apparently bare. Mandible (Fig. 30) short, broad, about 1.1–1.2× longer than width between tooth 1 and 3; broadening from base to apex; tooth 1 narrower and extending further distad than tooth 3; tooth 2 without dorsal knob; diagonal ridge poorly developed to absent. Eye 1.25–1.5× longer than temple; eyes not converging ventrally, lacking obvious setae. Antenna 34–35 segmented; first flagellomere 1.4–1.6× longer than second. Maxillary palp slightly longer than height of head. *Mesosoma*: 1.3–1.45× higher than wide; 1.35–1.4× longer than high. Pronotum dorsally smooth, polished, with distinct median pit. Mesonotum not as abruptly declivitous anteriorly as in *angusta*; setae and notauli as in *angusta*; midpit shorter, but not punctiform. Prescutellar pit with median ridge and numerous lateral carinae. Metanotum medially as in *angusta*; lateral fields smooth, polished. Propodeum pol-

ished, weakly wrinkled and punctate, the sculpture irregular (better developed on paratype); spiracle as in *angusta*. Pronotum laterally with anterior margin produced as in *angusta*; smooth and polished throughout. Mesopleuron with posterior margin finely crenulate; sternaulus a weak, unsculptured median impression. Metapleuron with ventral half of anterior margin bearing very shallow trough; ventral flange prominent, more acutely pointed than in *angusta*; surface carinate to rugulose just dorsad hind coxa. *Wings* (Figs. 28, 29): fore wing stigma broad, tapering gradually into R1 distally, roughly $4\times$ longer than wide; r arising very slightly basad midpoint; 1-RSb and 2-RSa approximately equal in length; r $0.25-0.30\times$ length of 2-RSa; 2-RSb as in *angusta*; RS + Ma barely sinuate; m-cu distinctly postfurcal; M + CU very weakly pigmented and nebulous basally, increasingly well-developed distally, pigmented and tubular over apical 0.15 ; 1cu-a postfurcal by about its own length; 2-1A nearly absent distally, very weak and largely depigmented basally; 2cu-a nearly absent, represented by a short stub. Hind wing with M + CU $1.3-1.5\times$ longer than 1-M. *Metasoma*: petiole about twice longer than wide, nearly parallel-sided, heavily striate, the striae slightly more medially directly and less regular than in *angusta*; dorsope and basal carina as in *angusta*. T2 with striae basal-laterally in holotype; unsculptured in paratype. *Color*: orange; clypeus and mandible yellow-orange; palps, coxae, trochanters, femora and most of tibiae pale yellow; apical half of hind tibia and all tarsi (at least dorsally) pale brown; antenna brown; head, petiole and most of T2 dark brown; paratype with propodeum, metapleuron, and part of mesopleuron infuscate; wings hyaline. *Body length*: 2.4 mm.

♀: unknown.

Material examined.—Holotype ♂: "Butamalal, Arauco, CHILE 21.II.1953 L. E. Peña" (CNC). Paratype: 1 ♂, same data as holotype (CNC).

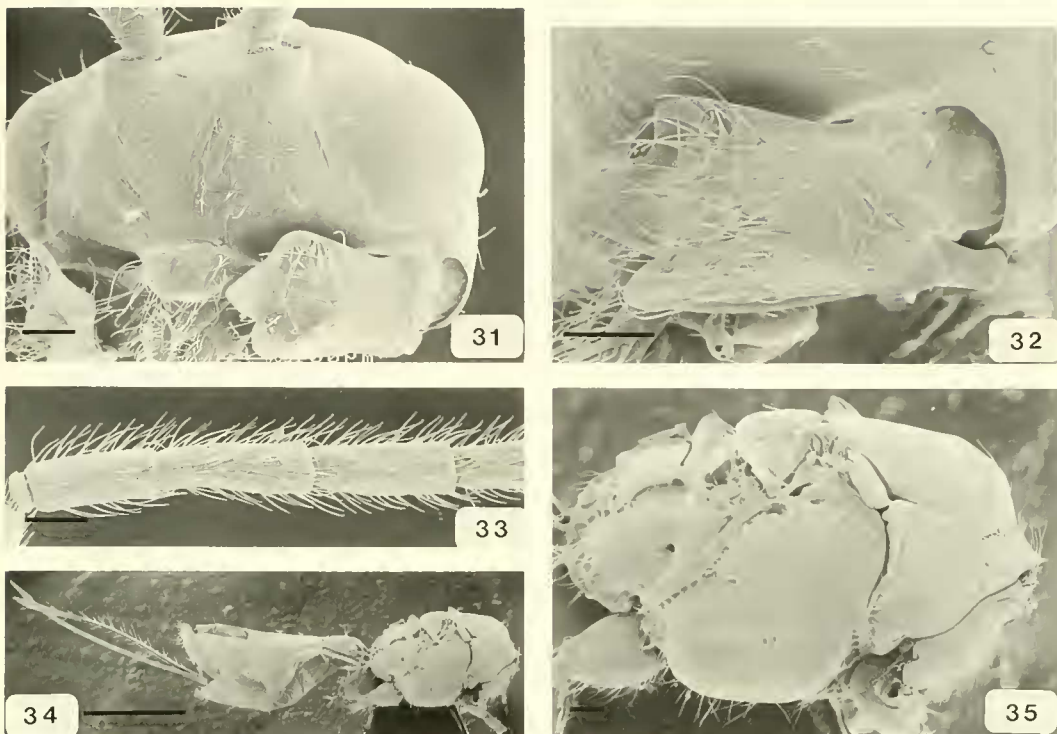
Diagnosis.—This species is similar to *angusta*, but is slightly broader. Major differences are in the shape of the mandible (which is short and broad in *crassa* and narrow, with dorsal knob on tooth 2 in *angusta*), the broader stigma, and the postfurcal insertion of m-cu in the fore wing.

Discussion.—The mesonotal disk and petiole are nearly identical in *angusta* and *crassa*, and, together with the shape of the stigma and loss of certain wing veins, these provide the most significant synapomorphs uniting these taxa. Although the stigma is distinctly thickened, relative to *angusta*, the shape suggests a secondary thickening derived from a narrow, more linear stigma. The typical plesiomorphic form of a hemispherical or wedge-shaped stigma is not found in *Dapsildiastema*. The species name refers to the thickened stigma.

Genus *Phaenocarpa* Foerster

Phaenocarpa Foerster 1862: 267. Type species: *Alysia picinervis* Haliday (monobasic and original designation).

Phaenocarpa is one of the largest genera within the Alysini (Wharton 1980). The most recent revision is by Fischer (1990), who treats the Palearctic species and provides a complete generic synonymy. Although the species of *Phaenocarpa* are generally identifiable as such, traditional recognition of several smaller monophyletic taxa at the generic rank (e.g. *Asobara*, *Aphaereta*, *Heratemis* Walker) makes it difficult to define *Phaenocarpa* other than on the basis of features which are plesiomorphic relative to these taxa (Wharton 1980). *Phaenocarpa* has thus become the basal group from which these other taxa have been derived. While unsatisfactory from a phylogenetic standpoint, retention of *Phaenocarpa* as a basal group serves a practical purpose (identification and literature retrieval) during on-going studies to better define the included elements. Two such elements are described here. Both are treated



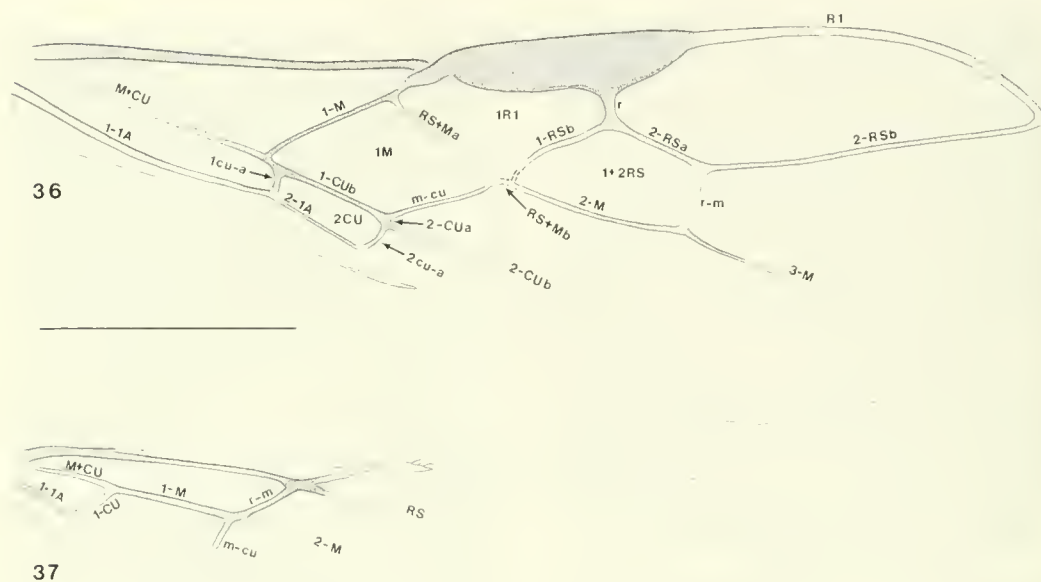
Figs. 31–35. *Phaenocarpa* sp. near *anomala* (from Durango, Mexico). 31, Face; scale bar = 100 μ m. 32, Left mandible; scale bar = 100 μ m. 33, Antenna, showing basal three flagellomeres; scale bar = 100 μ m. 34, Right side of body showing relative length of ovipositor; scale bar = 1 mm. 35, Right side of mesosoma; scale bar = 100 μ m.

as species groups within *Phaenocarpa* even though they each have several derived traits which could be used to define them as separate genera. This avoids the addition of still more genus group names to the *Phaenocarpa* complex, while allowing discussion of the relationships of these species to other elements within the complex.

PHAENOCARPA ANOMALA SPECIES GROUP

Description.—*Head*: mandible (Figs. 31, 32) with 3 well-developed teeth; tooth 2 lacking dorsal knob, separated by distinct cleft from tooth 1; diagonal ridge well developed; ventral margin of mandible carinate. Face not unusually short. Antenna with first flagellomere distinctly shorter than second (Fig. 33). Clypeus short, strongly protruding (Fig. 31). Epistomal sulcus broad, deep. Malar space not developed. Maxillary

palp 6 segmented; labial palp 4 segmented. *Mesosoma*: pronotum dorsally (Fig. 39) with median pit (varying from shallow depression to deep hole). Mesonotum (Fig. 39) lacking crenulate margin anterior-laterally; anterior declivity not delimited dorsally by transverse ridges extending mesally from lateral margins. Notauli deeply impressed at anterior declivity. Mesonotal midpit present. Scutellum somewhat flattened, without posterior spine. Metanotum (Fig. 38) with median ridge well-developed, flange-like. Propodeum (Fig. 38) carinate, with small median areola. Sternaulus distinctly impressed, usually sculptured. *Wings* (Figs. 36, 37): fore wing with radial cross vein (r) arising well distad middle of discrete, wedge-shaped stigma; 1-RSb equal to or longer than 2-RSa; m-cu entering cell 1R1; cell 2CU not unusually narrow; closed



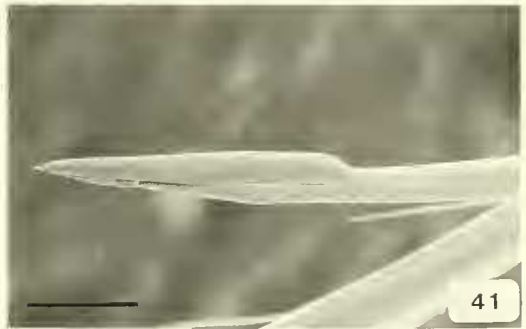
Figs. 36, 37. *Phaenocarpa anomala*. 36. Fore wing. 37. Hind wing. Scale bar = 0.96 mm. Abbreviations as used in text. For veins, R = Radius (R1 is also called the metacarpus); RS = Radial Sector; r = radial cross-vein; M = Media; m-cu = medio-cubital cross-vein; CU = Cubitus; cu-a = cubito-anal cross-vein; 1A = First Anal. Vein segments intercepted anteriorly by a cross-vein are designated 1-, 2-, etc.; vein segments intercepted posteriorly by a cross-vein are designated a, b, c, etc. For cells, 1R1 = first submarginal; 1 + 2RS = second submarginal; 1M = discoidal; 2CU = subdiscal.

distally; 2-CUb interstitial or nearly so (2-CUa usually absent). Hind wing with m-cu well developed; M + CU nearly equal in length to 1-M; 3 hamuli. *Metasoma*: not laterally compressed; terga unsculptured posteriad petiole. Ovipositor sheath (Fig. 34) sparsely setose.

Diagnosis.—This species group is characterized by the short second flagellomere, sparsely setose ovipositor sheath, anterior migration of 2-CUb, short 2-RSa, loss of the dorsal knob on tooth 2, distal displacement of the origin of r on the stigma, and reduction of the posterior portion of the notaulus. The first three character stages help to place this species group within *Phaenocarpa*, while the others are found only in certain species and species groups within *Phaenocarpa*. The members of this group differ from other *Phaenocarpa* in having a short second submarginal cell, a feature which Wharton (1980) hypothesized as a

plesiomorphic trait within the Alysiini. Thus, members of the *anomala* species group lack one of the major synapomorphs used by most previous workers to define *Phaenocarpa*, and consequently more closely resemble the sympatric *Idiasta*, *Gnathopleura*, and *Alysiasta* in this regard. Many of the character states listed in the above diagnosis are putative synapomorphs uniting *Phaenocarpa*, *Gnathopleura* and *Alysiasta* relative to *Idiasta*. However, *anomala* and related species lack the 4-toothed mandible characteristic of *Gnathopleura* and the shortened face and recurved 2-RSb of *Alysiasta*. They are therefore provisionally placed in the larger, more ill-defined genus *Phaenocarpa* rather than in either of these two smaller, more precisely defined genera.

Discussion.—This group contains a small complex of species occurring from Chiapas in southern Mexico, north through Durango and into southern Arizona. One species is



Figs. 38–41. *Phaenocarpa* sp. near *anomala* (from Durango, Mexico). 38, Dorsal-posterior view of mesosoma. 39, Pro- and mesonotum. 40, Dorsal view of petiole. 41, Apex of ovipositor, lateral view. Scale bars = 100 μ m.

described here to facilitate discussions on the difficulty of resolving relationships within the *Phaenocarpa* complex. Of major concern is the problem of defining *Idiasta* on the basis of derived characteristics relative to *Gnathopleura*, *Alysiasta* and *Phaenocarpa*. Members of the *anomala* species group are intermediate between *Idiasta* and these other genera in several respects, and resolution of their relationships will require a careful assessment of character state evolution within the *Phaenocarpa* complex [similar to that required for the correct placement of the Palaearctic *theodori* Snellen van Vollenhoven (Fischer 1967, Achterberg 1974, Wharton 1980)].

***Phaenocarpa anomala* Wharton,
NEW SPECIES
(Figs. 36, 37)**

Description.—♀ *Head*: transverse in dorsal view, 1.6–1.75 (\bar{m} = 1.7) \times wider than long. Face (as in Fig. 31) smooth, polished, 1.5–1.7 (\bar{m} = 1.6) \times wider than high. Frons

smooth, polished, with shallow, median, sculptured depression basally (barely indicated in smaller individuals). Mandible (as in Figs. 31, 32) 1.7–1.9 \times longer than width between tooth 1 and 3; rugose sculpture confined to subapical band between tooth 1 and 3, otherwise smooth, polished; tooth 3 narrow, acute, extending distad tooth 1 which is broad, more or less orthogonal; tooth 2 broad with base and height subequal. Eye 2.1–2.6 (\bar{m} = 2.4) \times longer than temple, lacking obvious setae. Antenna (as in Fig. 33) 33–34 segmented; second flagellomere 1.5–1.7 (\bar{m} = 1.6) \times longer than first; third flagellomere 1.3–1.4 \times longer than first. Maxillary palp longer than height of head. *Mesosoma*: about 1.35–1.45 \times higher than wide; 1.4–1.45 \times longer than high. Pronotum dorsally (about as in Fig. 39) a polished, narrow band with deep median pit. Mesonotal disk (as in Fig. 39) polished, nearly bare, setae largely confined to weakly sculptured notauli; notauli confined to anterior declivity, widely separated from midpit;

midpit and prescutellar pit as in Figs. 38, 39. Metanotum (as in Figs. 35, 38) with median flange extending from base to apex; lateral field virtually unsculptured. Propodeum (about as in Fig. 38) with median longitudinal carina on anterior half and small, irregular, pentagonal areola on posterior half; anterior-lateral corners of pentagon producing a transverse carina extending to lateral longitudinal carina at level of propodeal spiracle; anterior-lateral fields of propodeum smooth, polished; posterior field irregularly rugose. Mesopleuron (as in Fig. 35) polished, nearly bare medially; posterior margin crenulate throughout; sternaulus absent anteriorly, crenulate medially, extending to hind coxa as a narrow, unsculptured groove. Metapleuron smooth, polished, covered with long, white, ventrally-directed setae. *Wings* (Figs. 36, 37): fore wing stigma 4.5–5.0 × longer than broad; 1-RSb 1.1–1.35 ($\bar{m} = 1.2$) × longer than 2-RSa; 2-RSb straight, extending to wing tip or nearly so; m-cu antefurcal by 0.16–0.22 ($\bar{m} = 0.18$) × its length; M + CU nebulous basally but pigmented throughout; 1cu-a postfurcal by about its own length. Hind wing with 1-M 1.1–1.4 ($\bar{m} = 1.2$) × longer than M + CU. *Metasoma*: petiole 1.15–1.35 × longer than apical width; striate, dorsal carinae short, strongly convergent, meeting anterior level of spiracle; dorsople deep. Ovipositor (as in Figs. 34, 41) 2.2–2.4 × longer than thorax. *Color*: dark brown to reddish brown; coxae, trochanters, and antenna brown; remainder of legs, ovipositor and mesonotum around notauli yellow or yellow brown; hypopygium pale yellow, nearly white; palps white or nearly so. *Body length*: 2.9–4.6 mm.

♂ and biology: unknown.

Material examined.—Holotype ♀: "MEX. Chis. 7200 ft. S. Crist. las Casas 1–12 July 1969 Malaise Trap" (CNC). Paratypes: 5 ♀, same locality, 30.v, 3–7.vi, 25.vi, and 1–12.vii.1969 (CNC, TAMU).

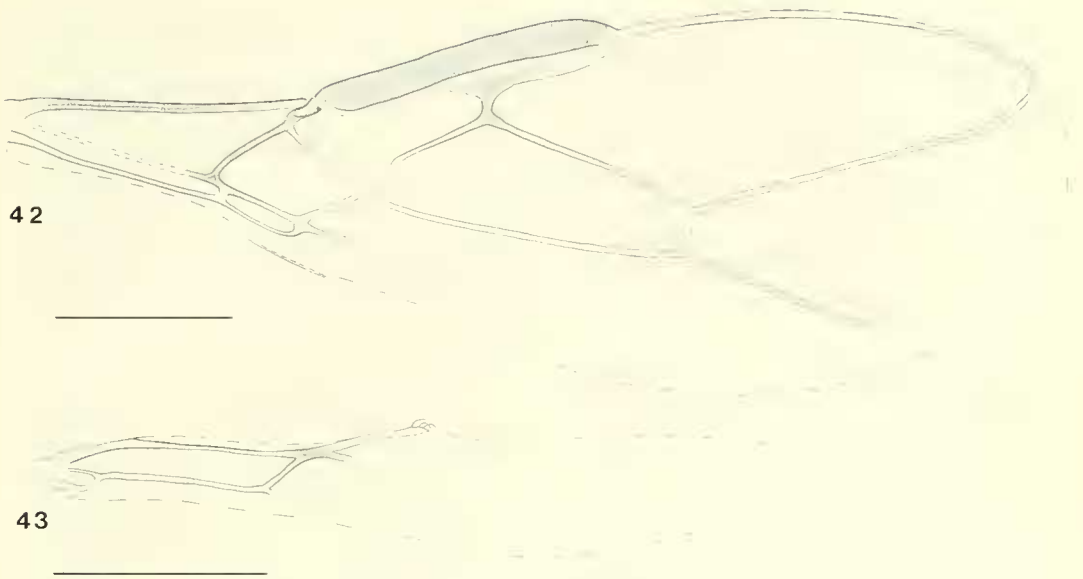
Diagnosis.—This species, from Chiapas, Mexico, is darker than the undescribed members of this species group which I have

seen from Durango, Sinaloa, and Arizona (CNC, TAMU). The latter have a much more extensively orange mesosoma. Additionally, *anomala* tends to have a more widely antefurcal fore wing m-cu, a larger eye, a taller face, and better developed petiolar carinae than most of these other species.

This species name refers to the anomalous shape of the fore wing cell 1 + 2RS relative to most other *Phaenocarpa* species

PHAENOCARPA CRATOMORPHA SPECIES GROUP

Description.—*Head*: mandible with 3 well-developed teeth, sometimes with fourth tooth present between tooth 1 and 2; tooth 2 otherwise separated by distinct cleft from tooth 1 and distinctly protruding beyond tooth 1 and 3 (Fig. 45); diagonal ridge well-developed; ventral margin of mandible with wide carina. Antenna longer than body, individual flagellomeres much longer than wide in both sexes; first flagellomere variable, but usually slightly shorter than second. Eye-antennal sulcus often present (Fig. 44). Clypeus of moderate size (Fig. 44), convex, though only weakly so in some species, never strongly protruding, hemispherical to nearly rectangular in outline. Epistomal sulcus narrow, shallow to moderately deep. Malar space not developed. Maxillary palp very long (Fig. 47), 6 segmented; labial palp 4 segmented. *Mesosoma*: pronotum dorsally with midpit present, though sometimes obscured by crenulate sculpture. Mesonotum with anterior-lateral margin nearly always continuously crenulate to base of notaulus; (Fig. 50), rarely interrupted; anterior declivity delimited dorsally by transverse ridges extending mesally from lateral margins. Metanotum with either median ridge or distinct spine (Fig. 47, arrow), the latter occasionally quite long. Propodeum with median carina anteriorly and narrow median areola posteriorly (Fig. 51). Sternaulus long, distinctly impressed, crenulate. *Wings* (Figs. 42, 43, 48, 49): fore wing with radial



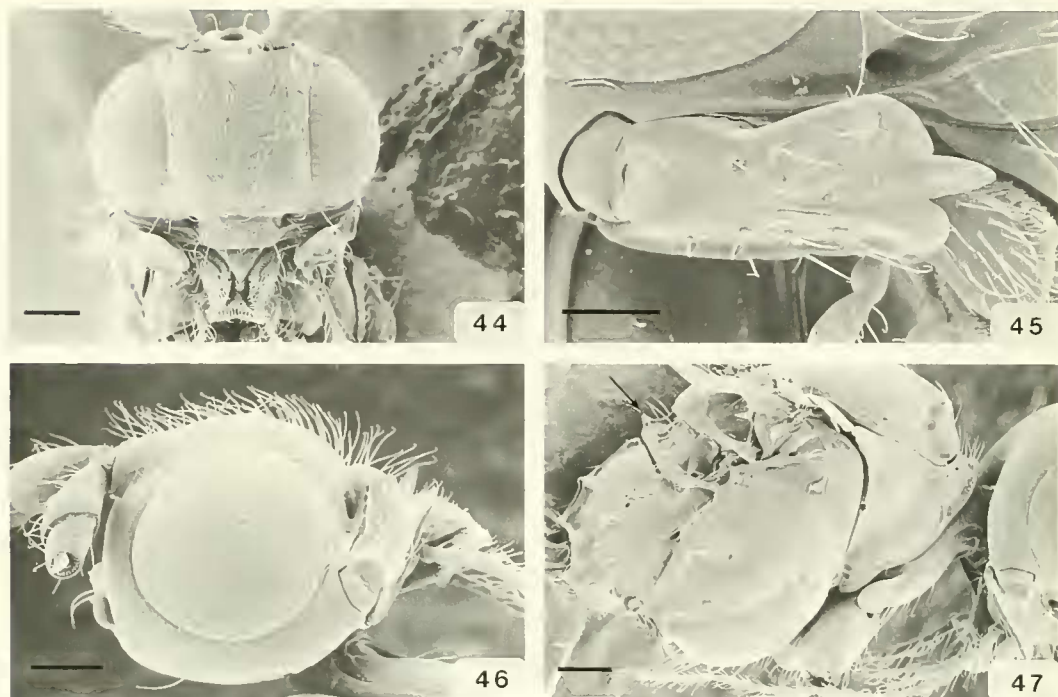
Figs. 42, 43. *Phaenocarpa cratomorpha*. 42, Fore wing; scale bar = 0.48 mm. 43, Hind wing; scale bar = 0.4 mm.

cross-vein (r) arising slightly basad midpoint of stigma in males of at least one species, but more commonly arising slightly distad midpoint; stigma variable in shape, usually narrow in basal half, broader distally, discrete, not merging imperceptibly with metacarpus distally; males of many species with stigma split from base to apex by a hyaline streak; 2-RSa longer than 1-RSb; m-cu nearly always entering cell 1R1, rarely interstitial with 1-RSb or entering cell 1 + 2RS; cell 2CU short, closed distally; 2-CUb interstitial (2-CUa absent or fused with 2-CUb). Hind wing with m-cu absent; M + CU distinctly shorter than 1-M; 2-M represented by a short, sclerotized stub, usually distinctly angled towards posterior wing margin. *Metasoma*: not laterally compressed; petiole with dorsope; terga unsculptured posteriad petiole. Ovipositor sheath moderately setose (Fig. 53); ovipositor very slightly swollen subapically, but without discrete subapical node (Fig. 53).

Diagnosis.—This species group is characterized by the shape of the stigma (Figs. 42, 48), the poorly developed subapical node

on the ovipositor, and the absence of m-cu in the hind wing. The long cell 1 + 2RS, interstitial 2-CUb, hind wing with short M + CU, assist in the placement of this group in the genus *Phaenocarpa*. The basal flagellomere, however, is unusually long for members of this genus.

Discussion.—The above description is based on 12 species (specimens from AEI, BMNH, CAS, CNC, TAMU) ranging from Central Mexico through Brasil. Males which have a divided stigma are very distinctive, and it is tempting to accord this group generic rank on that basis. The elongate metanotal spine found in some of these species further separates this group from more typical members of the genus *Phaenocarpa*. However, females of all species examined thus far lack the divided stigma, and males of at least two species also have an undivided stigma. Further, there is a gradual transition among the species available for study from those with a long metanotal spine to those with a relatively low flange (as in Fig. 47). The most plesiomorphic forms within each of these two character systems



Figs. 44–47. *Phaenocarpa sharkeyi*. 44, Face; scale bar = 100 μ m. 45, Right mandible; scale bar = 50 μ m. 46, Lateral view of head; scale bar = 100 μ m. 47, Right side of mesosoma, showing metanotal spine (arrow); scale bar = 100 μ m.

have been the deciding factors in my placement of the *cratomorpha* species group within *Phaenocarpa*. Members of this species group also resemble, in some respects, both *Heratemis* (deflected hind wing 2-M) and *Cratospila* (head shape, ovipositor, and long flagellomeres). It is tempting to place the *cratomorpha* species group in *Cratospila* because of the similarity in habitus. Their derivation from *Cratospila*, however, would require a shortening of the hind wing M + CU, elongation of fore wing cell 1 + 2RS, a change in the shape of the fore wing cell 2CU, development of transverse ridges along dorsal margin of anterior declivity, development of metanotal flange or spine, and loss of mesosomal sculpture. All of these character states are found in at least some members of the genus *Phaenocarpa*, though none is unique to the genus. Placement in

Cratospila would therefore require heavy weighting of the antennal character.

This is a Neotropical species group, and I have seen a small number of specimens each from various localities in Mexico, El Salvador, Costa Rica, Brasil, and Ecuador. Two species are described here to illustrate some of the variation within the group.

Phaenocarpa cratomorpha Wharton,
NEW SPECIES
(Figs. 42, 43)

Description.—♀ *Head*: moderately transverse in dorsal view, 1.5 \times wider than long. Face finely punctate, polished, 1.2 \times higher than wide. Frons smooth, polished, bare. Mandible 1.9 \times longer than width between tooth 1 and 3, slightly wider at apex than at base, dorsal margin shallowly concave; surface largely smooth, with only weak

sculpture apically; tooth 1 broad, nearly orthogonal; cleft between tooth 1 and 2 deep, lacking additional tooth or knob; tooth 3 narrower, slightly acute, projecting slightly more distally than tooth 1; tooth 2 narrowly triangular, longer than basal width. Eye large, $3.1\times$ longer than temple, lacking obvious setae. Anterior tentorial pit small (as in Fig. 44). Antenna 28 segmented; apex of scape strongly excavated laterally; second flagellomere $1.1\times$ longer than first. Maxillary palp more than $2\times$ longer than height of head. *Mesosoma*: $1.45\times$ higher than wide; $1.4\times$ longer than high. Pronotum dorsally weakly and irregularly rugulose; groove along posterior margin widely interrupted medially; anterior margin weakly emarginate. Mesonotal disk polished, with 4–5 setae per side, extending along notauli; anterior declivity vertical, with scattered setae; notauli with crenulate transverse portion extending posteriorly only a short distance, not reaching well-developed midpit; median mesonotal lobe with unsculptured median longitudinal groove. Prescutellar pit about twice broader than long, with median carina. Metanotum with thin longitudinal flange along midline, flange shorter than mid-dorsal length of metanotum. Sternaulus crenulate throughout, narrower posteriorly. *Wings* (generally similar to Figs. 48, 49): fore wing with stigma narrow, solid throughout, basal half distinctly narrower than distal half, $5.5\times$ longer than broad; r short, slightly longer than half mid-width of stigma, arising slightly distad middle of latter; 2-RSa $1.5\times$ longer than 1-RSb; 2-RSb extending to wing tip, very weakly recurved at apex; m-cu distinctly antefurcal; 1cu-a postfurcal by slightly more than its own length. Hind wing with 1-M $2.8\times$ longer than M + CU; 3 hamuli. *Metasoma*: petiole $1.7\times$ longer than apical width; weakly strigose, sculpture weaker laterally, dorsal carinae more or less parallel-sided, weakly developed, absent posteriorly; dorsope a deep pit. Ovipositor sheath bearing 12–15 long setae plus a cluster of

short setae at apex; sheath length about as in *sharkeyi* n. sp., but partially retracted and therefore difficult to measure. *Color*: dark brown; pronotum dorsally, propleuron, mesonotum, and metasomal terga 3 and following brown or yellow brown; dorsal part of face, scape, pedicel, mandible, lower temple, legs (except fore and mid coxa white ventrally and hind coxa infumate dorsally at base) yellow; palps and flagellomeres 20–23 white; wings hyaline. *Body length*: 2–3 mm.

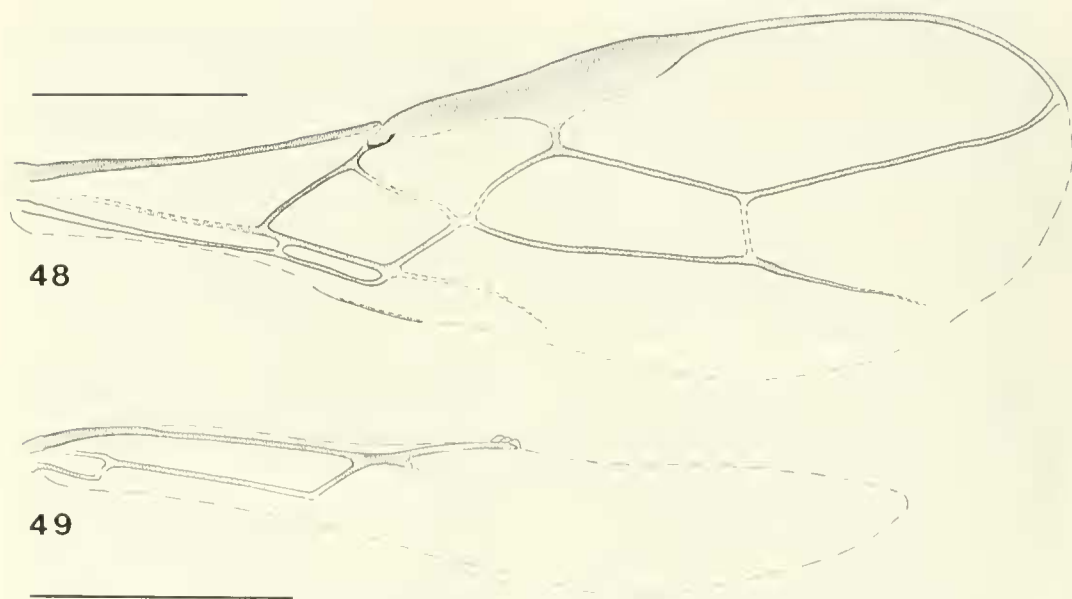
δ : Similar to female except as follows: head 1.4 – $1.45\times$ wider than long. Face 1.05 – $1.1\times$ higher than wide. Mandible 1.8 – $2.0\times$ width between tooth 1 and 3. Eye distinctly smaller, 2.1 – $2.2\times$ longer than temple. Second flagellomere 1.1 – $1.2\times$ longer than first. Propodeal areola ill-defined. Fore wing stigma split (Fig. 42) with thickened, linear portion along anterior margin separated basally by a hyaline streak from the posterior portion connected to r; stigma 6 – $7\times$ longer than broad; 1-M of hind wing $2.5\times$ longer than M + CU. Petiole 1.75 – $2.0\times$ longer than apical width, with dorsal carinae better developed and more nearly convergent than in female.

Biology: unknown.

Material examined.—Holotype η : “MEXICO: Guerrero 6.4 mi SW Filo de Caballo 9000 ft VIII-8-1987 R. Wharton” (USNM). Paratypes: 2 δ , same data as holotype (TAMU).

Diagnosis.—This species is characterized by sexual dimorphism in the shape of the stigma, its variegated color pattern, and the shape of the median flange on the metanotum. Other species which I have seen from this region of Mexico are generally darker, and either have the stigma solid in both sexes and/or a median mesonotal spine. *Phaenocarpa sharkeyi* n. sp., described below, has a lighter-colored head and a more spine-like (rather than flange-like) metanotal projection.

Discussion.—This species is named for



Figs. 48, 49. *Phaenocarpa sharkeyi*. 48, Fore wing; scale bar = 0.96 mm. 49, Hind wing; scale bar = 0.8 mm.

its superficial resemblance to members of the genus *Cratospila* (see species group discussion above).

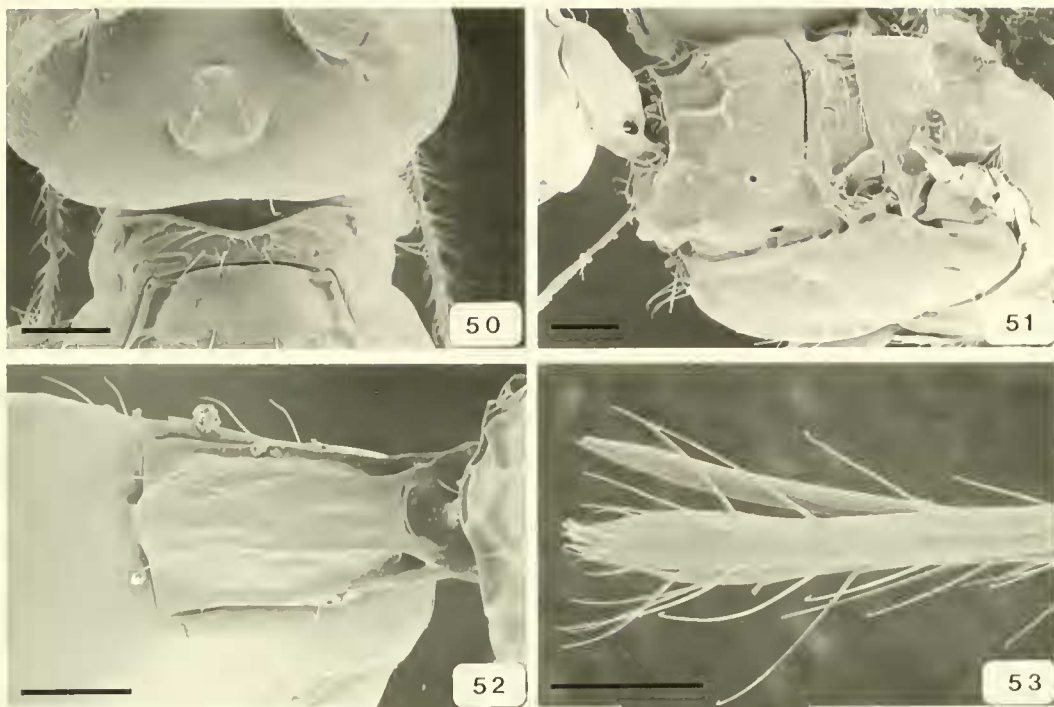
Phaenocarpa sharkeyi Wharton,

NEW SPECIES

(Figs. 44–53)

Description.—♀ *Head*: moderately transverse in dorsal view, $1.45\times$ wider than long. Face (Fig. 44) finely punctate, polished, $1-1.05\times$ higher than wide. Frons (Fig. 50) smooth, polished, bare. Mandible (Fig. 45) $1.7-1.9\times$ longer than width between tooth 1 and 3, otherwise as in *P. cratomorpha*. Eye very large (Fig. 46), $4.7-6.2\times$ longer than temple, lacking obvious setae. Anterior tentorial pit relatively small (Fig. 44). Antenna 27–29 segmented; scape at apex strongly excavated laterally; second flagellomere $1-1.05\times$ longer than first. Maxillary palp more than $2\times$ longer than height of head. *Mesosoma*: narrow, $1.6\times$ higher than wide; $1.4\times$ longer than high. Pronotum dorsally (Fig. 50) with shallow, barely perceptible median pit, very weakly rugulose me-

dially, smooth laterally; groove along posterior margin widely interrupted medially; anterior margin deeply emarginate. Mesonotal disk polished, with 1–2 setae per side; anterior declivity nearly vertical (Fig. 47), with 2–4 setae; notauli with transverse portion deep and crenulate, then extending posteriorly to midpit as two smooth, very shallow, weakly converging lines; midpit deep. Prescutellar pit about twice broader than long, with median carina. Metanotum (Figs. 47, 51) with short median spine arising from posterior margin, spine shorter than mid-dorsal length of metanotum. Sternaulus (Fig. 47) with sculpture confined largely to anterior half. *Wings* (Figs. 48, 49): fore wing with stigma narrow, solid throughout, basal half distinctly narrower than distal half, $5.7-6.2\times$ longer than broad; r short, about half mid-width of stigma, arising from middle of latter; 2-RSa $1.4-1.7\times$ longer than 1-RSb; 2-RSb extending to wing tip, weakly recurved at apex; m-cu distinctly antefurcal; 1cu-a postfurcal by slightly more than its own length. Hind wing with 1-M $2.1-2.7\times$



Figs. 50–53. *Phaenocarpoa sharkeyi*. 50, Dorsal view of head, pronotum and anterior portion of mesonotum. 51, Posterior-lateral view of mesosoma. 52, Dorsal view of petiole. 53, Apex of ovipositor and sheath, lateral view. Scale bars = 100 μ m.

longer than M + CU; 3 hamuli. *Metasoma*: petiole (Fig. 52) 1.65–1.75 \times longer than apical width; dorsal carinae more or less parallel-sided, weakly developed to absent on posterior half; weakly rugulose, especially posterior-medially; dorsope deep. Ovipositor sheath 0.6–0.7 \times length of mesosoma; bearing 12–15 long setae plus a cluster of 5–6 short setae at apex (Fig. 53). *Color*: yellow, metasomal terga variously blotched with yellow-brown; coxae, trochanters largely, metasomal sterna, palps, and most of mandible white; antenna with scape, pedicel, and basal 4–6 flagellomeres yellow; 8–10 subapical flagellomeres white; remaining flagellomeres brown to dark brown; wings hyaline. *Body length*: 2.5 mm.

♂ and biology: unknown.

Material examined.—Holotype ♀: “ECUADOR, Pich. S. Domingo, 16 km SE Tinalandia 680m. 15–30.vi.75 Peck” (CNC).

Paratypes: 2 ♀, same data as holotype (CNC, TAMU).

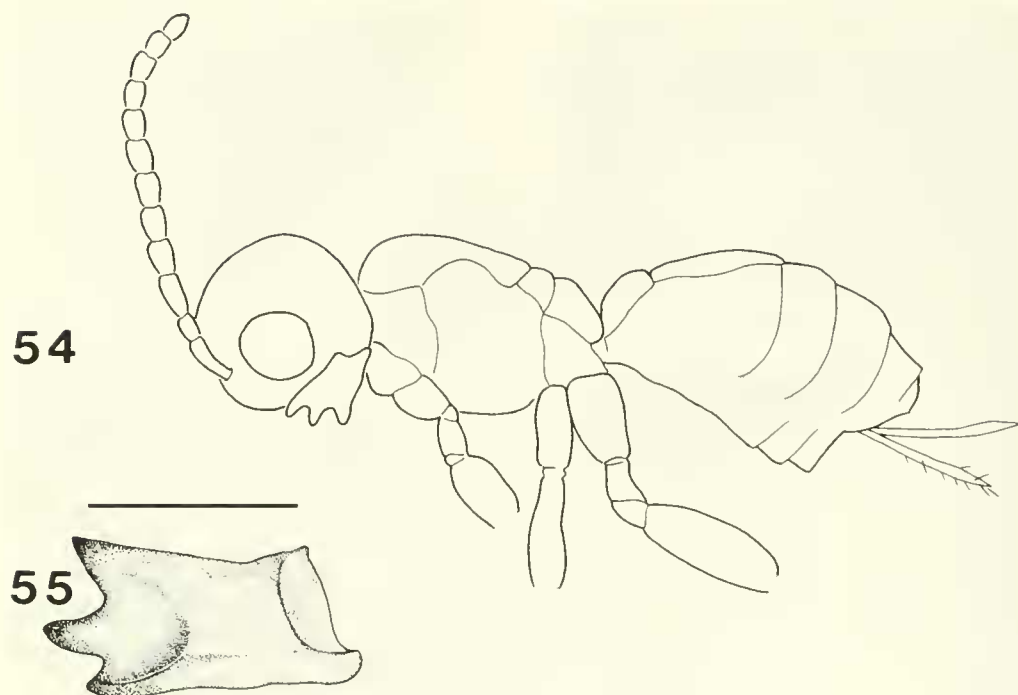
Diagnosis.—This species is most readily recognized by its pale coloration and relatively short metanotal spine. All other species known to me (both described and undescribed) have at least part of both head and thorax brown.

Discussion.—This species is named for Michael Sharkey (CNC, Ottawa) in recognition of his valuable contributions to the study of braconids.

Genus *Pneumosema* Fischer

Pneumosema Fischer, 1966b: 207. Type species: *Pneumosema stigmaticum* Fischer (monobasic and original designation).

Fischer (1966b) described *Pneumosema* from a single species collected in New York.



Figs. 54, 55. *Pneumosema perditum*. 54, Lateral view of body showing short antenna. 55, Left mandible; scale bar = 0.25 mm.

This species appears to be relatively restricted in distribution to northeastern United States and southeastern Canada. Although superficially resembling members of the *Aspilota* complex [see Wharton (1980, 1985) and Achterberg (1988) for discussion of this complex] due to its small size and short, robust antenna, the venation is distinctly different and the mandible is unusually large.

A second species, collected recently in Louisiana, helps to further characterize this genus. Though known from only a single specimen, it is described here to facilitate studies on the relationships among the genera of the *Alysia* and *Aspilota* complexes.

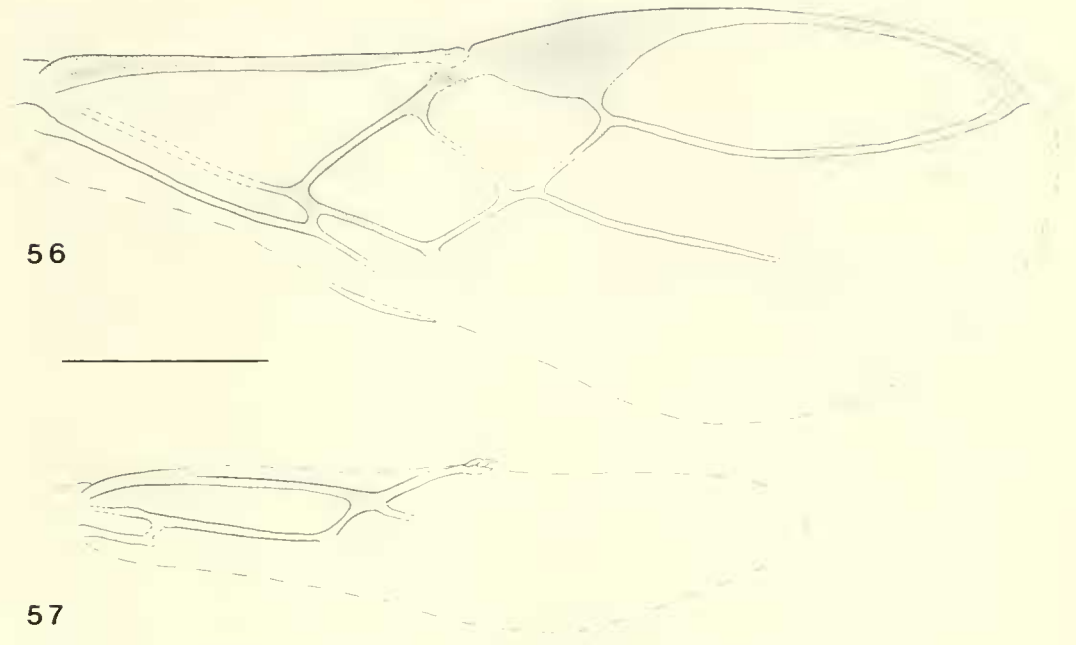
***Pneumosema perditum* Wharton,**

NEW SPECIES

(Figs. 54–57)

Description.—♀ *Head*: subcubical in dorsal view, about $1.25\times$ wider than long;

temples broad, head in dorsal view $1.1\times$ wider at temples than at eyes. Face very short, sparsely setose, polished, $2.45\times$ wider than high. Frons short, smooth, virtually bare. Clypeus short, rounded, strongly protruding. Mandible (Fig. 55) $1.8\times$ longer than width between tooth 1 and 3; broad, slightly wider at apex than at base, wider apically than height of face; surface rugulose medially, deeply concave apically; 3-toothed, with deep clefts between tooth 1 and 2 and between 2 and 3, without dorsal knob on tooth 2, tooth 1 only slightly larger than tooth 3, both equally distant from base and sharply pointed, nearly orthogonal; diagonal ridge and ventral margin both well developed and carinate. Eye about $1.3\times$ longer than temple (Fig. 54), with minute setae. Eye-antennal sulcus absent. Antenna (Fig. 54) about half length of body, 12 segmented; first flagellomere about $1.25\times$ longer than second, about $2.5\times$ longer than mid-width; remain-



Figs. 56, 57. *Pneumosema perditum*. 56, Fore wing. 57, Hind wing; scale bar = 0.3 mm.

ing flagellomeres short, less than twice longer than broad; all but apical flagellomere with broad patch of placoid sensilla. Palps very short, apparently 3 and 2 segmented, respectively. *Mesosoma*: $1.3\times$ higher than wide, $1.35\times$ longer than high. Pronotum barely visible in dorsal view, represented only by a thin, more or less vertical flange. Mesonotum with anterior declivity abrupt, vertical, not delimited dorsally by transverse ridges; anterior-lateral margin smooth, lacking crenulae; disk bare, with only a few short setae near top of anterior declivity; midpit and notaulus absent. Prescutellar pit narrow, roughly $4\times$ wider than mid-length, weakly sculptured and with an incomplete midridge; scutellum flat. Metanotum medially with large, flat, polished, nearly square boss. Propodeum with low median longitudinal carina, otherwise unsculptured; spiracle exceptionally large but posteriorly displaced so that diameter is equal to distance between spiracle and anterior margin of propodeum but more than twice distance to posterior margin. Sternaulus impressed for

most of length of mesopleuron, sculpture limited to a few weak crenulae. Metapleuron lacking obvious ventral flange or knob. Legs with femora somewhat thickened; hind femur about $2.4\times$ longer than mid-width. *Wings* (Figs. 56, 57): fore wing stigma large, nearly hemispherical, but tapering gradually into metacarpus distally, roughly $3\times$ longer than broad; r very short, much less than width of stigma; r-m absent, 2-RS evenly curved, ending slightly but distinctly before wing tip; m-cu antefurcal by about half its length; M + CU nebulous and very weakly pigmented for most of its length; 1cu-a postfurcal by its own length; cell 2CU broadly open; vein 2-CU_b interstitial with 1-CU_b (2-CU_a absent or fused with 2-CU_b), 2cu-a and distal half of 2-1A absent. Hind wing with M + CU about half length of 1-M; m-cu absent. *Metasoma*: petiole about as long as apical width, apex about $2\times$ wider than base; largely smooth and polished; spiracle enlarged, but only about half size of propodeal spiracle; dorsal carinae short, widely separated at base, diverging medially

to posterior margin of spiracle; dorsope not developed. Remainder of metasoma unsculptured. Ovipositor with well-developed dorsal, subapical notch and node; sheath roughly $0.7 \times$ length of mesosoma. *Color*: dark brown; antenna, propleuron, part of pronotum and much of posterior half of mesosoma brown; legs yellow-brown; scape, pedicel, and mandible yellow; palps white; wings hyaline. *Body length*: 1.7 mm.

♂ and biology: unknown.

Material examined.—Holotype ♀: USA, "Louisiana: Natchitoches Parish, 10 mi. W. Gorum, VI-3 to 18-1989 R. Wharton" (USNM).

Diagnosis.—This species is readily separated from the type species, *P. stigmaticum* Fischer, by the loss of the r-m cross-vein in the fore wing (from whence the specific name). The mandible is also more symmetrical than in *perditum*, and the dorsope of the petiole is undeveloped. The loss of fore wing vein r-m is a characteristic of the tribe Dacnusiini, and has heretofore been recorded only for a few aberrant specimens in the Alysini, and for *Grandia cynaraphila* (Ricchello) (Griffiths 1964, Wharton 1980). *Pneumosema perditum* is readily separated from dacnusiines, however, by the relatively long ovipositor and the size and shape of the mandibles and fore wing stigma.

Discussion.—The two known species of *Pneumosema* share several apomorphic traits. Both have greatly reduced palps, enlarged propodeal and petiolar spiracles, massive mandibles, very short antennae with short, broad flagellomeres, short hind wing M + CU, and a broadly open fore wing cell 2CU. They differ dramatically from members of the *Aspilota* complex in the retention of a well-developed stigma (not secondarily thickened as in *Prosapha*), the distinctly antefurcal fore wing m-cu, and the massive mandible with well-developed diagonal ridge.

As noted by Wharton (1980), *Pneumosema* does not closely resemble any of the other previously described genera of the

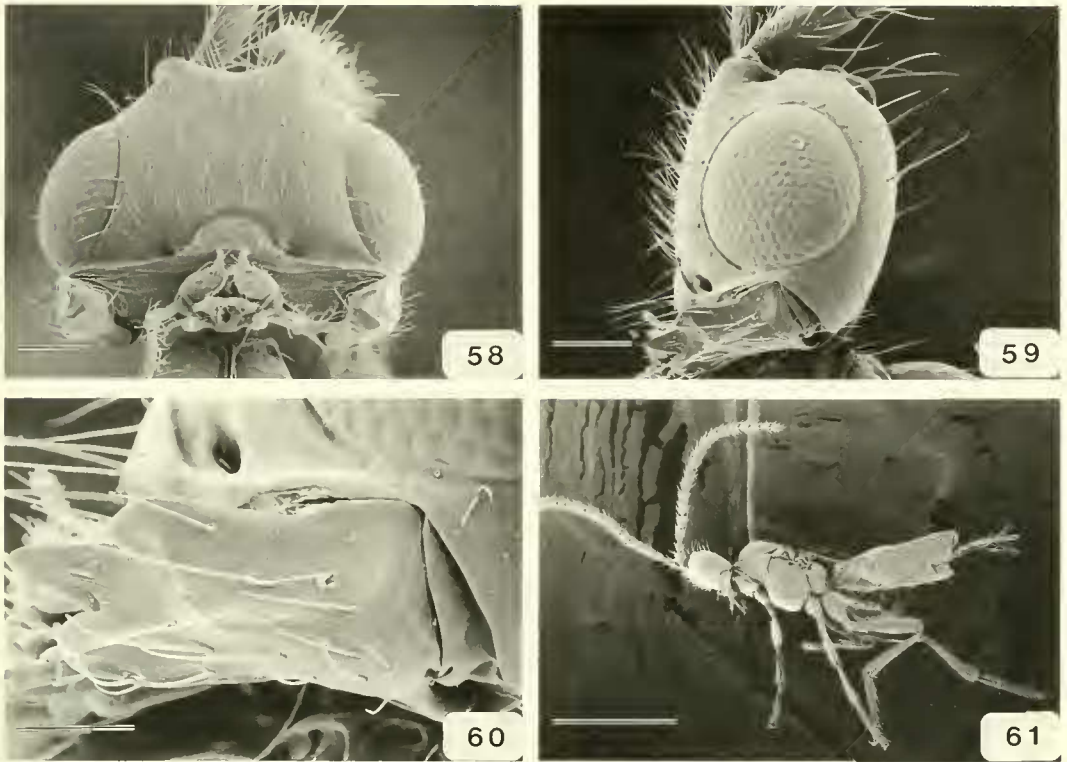
Alysiini, and the discovery of a second species serves only to emphasize the relatively large number of unusual characteristics. The reduced body sculpture, broad head, short antenna, and large propodeal stigma suggest a placement near the monobasic *Dinostigma* Fischer. The relationships of *Dinostigma* have also been difficult to establish because of the unusual wing vein pattern (Fischer 1966a, Wharton 1980). Achterberg (1988) placed *Dinostigma* as a sister-group of *Eudinostigma* Tobias within the *Aspilota* complex. The apomorphic character states used by Achterberg (1988, Fig. 1) to place *Dinostigma* within the *Aspilota* complex, however, apply equally as well to *Pneumosema*. Although *Dinostigma* and *Pneumosema* share several apomorphic traits, the genus *Vachterbergia* n. gen., described below, is also a strong candidate as the sister-group to *Pneumosema*, due to similarities in fore and hind wing venation as well as the reduced body sculpture and short antenna.

The holotype of *P. perditum* is not well preserved, as there was some slight shrivelling after removal from alcohol. This may have affected a few of the measurements given here. Further, the number of palp segments could not be counted accurately because the palps were not plainly visible.

Vachterbergia Wharton, NEW GENUS

Type species: *Vachterbergia grayi* Wharton, New Species.

Description.—*Head*: strongly compressed anterior-posteriorly (Figs. 59, 61). Mandible (Fig. 60) with 3 well-developed teeth; tooth 2 long, narrow, lacking dorsal knob, separated by distinct cleft from tooth 1; tooth 3 protruding distinctly distad tooth 1; diagonal ridge well-developed; ventral margin of mandible carinate. Antenna and flagellomeres short; first flagellomere about as long as second (Fig. 63). Eye-antennal sulcus absent. Clypeus (Figs. 58, 59) flat, bell-shaped. Epistomal sulcus narrow and deep. Malar space not developed. Palps re-

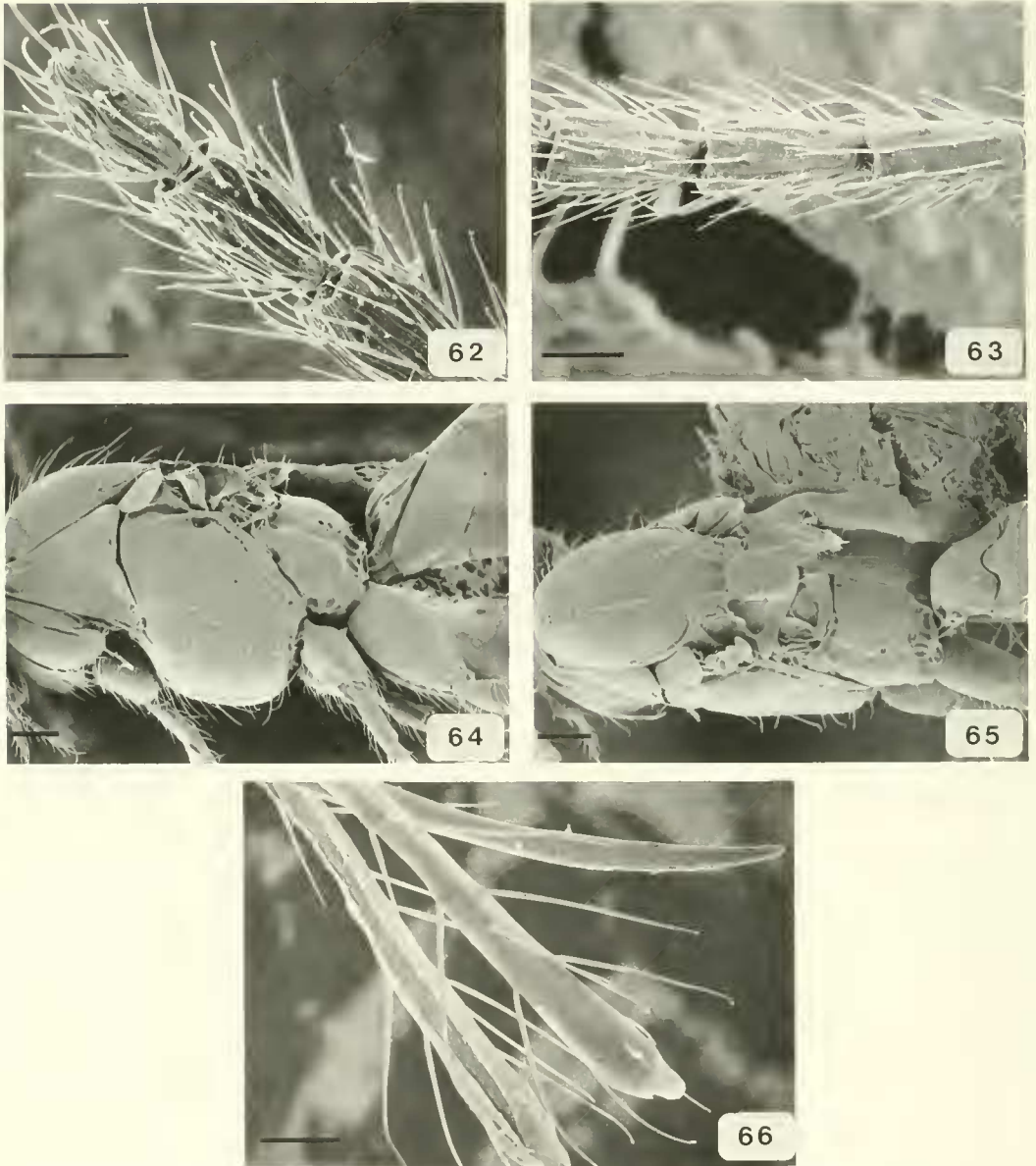


Figs. 58–61. *Vachterbergia* sp. 58, Face; scale bar = 100 μ m. 59, Lateral view of head; scale bar = 100 μ m. 60, Left mandible; scale bar = 10 μ m. 61, Lateral view of body; scale bar = 1 mm.

duced; maxillary palp 4–5 segmented, labial palp 2–3 segmented. *Mesosoma*: pronotum dorsally with weak median depression at anterior margin. Mesonotum (Fig. 65) lacking crenulate margin anterior-laterally; anterior declivity not delimited dorsally by transverse ridges extending mesally from lateral margins. Scutellum convex, neither strongly elevated nor with posterior spine. Metanotum with median ridge well-developed, flange-like. Propodeum (Fig. 65) largely unsculptured, with or without median ridge; propodeal spiracle slightly to distinctly enlarged. Sternaulus narrow, impressed, sculptured. *Wings* (Figs. 67, 68): fore wing with radial cross-vein (r) arising distad middle of discrete stigma; 2-RSa longer than 1-RSb; m-cu entering cell 1R1, widely separated from cell 1 + 2RS; cell 2CU narrow, closed distally; 2-CUb inter-

stitial (2-CUa absent or fused with 2-CUb). Hind wing with m-cu absent; M + CU distinctly shorter than 1-M. *Metasoma* (Fig. 61); not strongly laterally compressed; terga unsculptured posterior petiole. Ovipositor sheath sparsely setose (Figs. 61, 66). Known only from females from Ecuador and Venezuela.

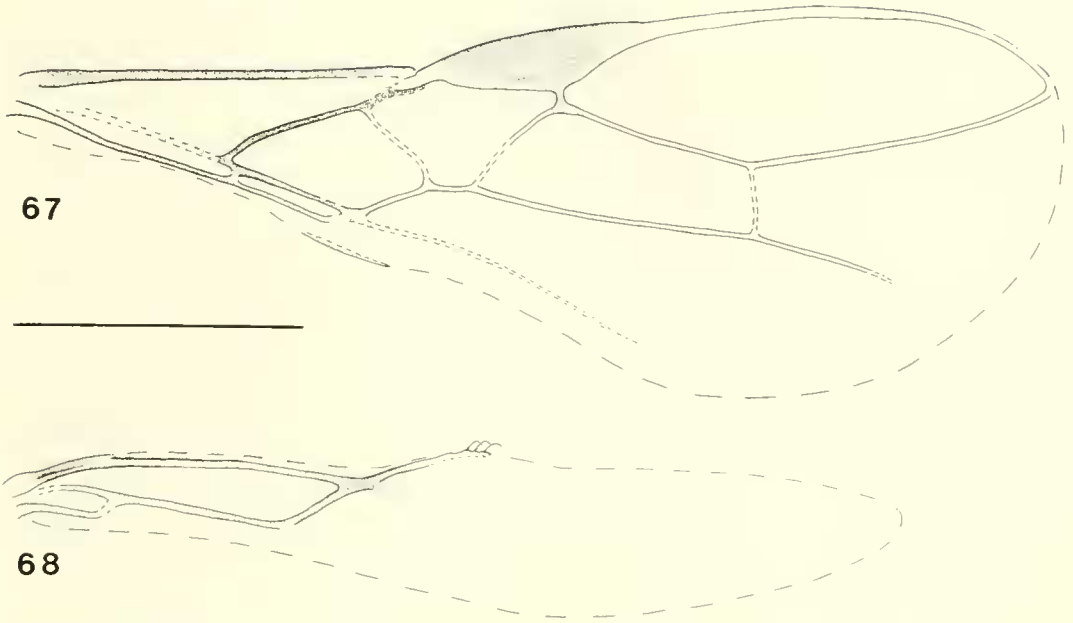
Diagnosis.—The genus is characterized by the strongly compressed head (Figs. 59, 61). Additionally, the following combination of characters serves to separate *Vachterbergia* from all other Alysini except *Pneumosema*: short antenna with short, broad flagellomeres and first flagellomere about equal in length to second; absence of ridge along inner margin of the notaulus; fore wing vein r arising distad short, discrete stigma, m-cu of fore wing antefurcal; and cell 1 + 2RS elongate. *Pneumosema* is char-



Figs. 62–66. *Vachterbergia* sp. 62, Antenna, showing apical 3 flagellomeres; scale bar = 50 μ m. 63, Antenna, showing basal 3 flagellomeres; scale bar = 50 μ m. 64, Left side of mesosoma and anterior portion of metasoma; scale bar = 100 μ m. 65, Dorsal view of mesosoma; scale bar = 100 μ m. 66, Apex of ovipositor and ovipositor sheaths, lateral view; scale bar = 50 μ m.

acterized and readily separated from *Vachterbergia* by the following apomorphic character states: pronotum dorsally greatly reduced; cell 2CU of fore wing open distal-posteriorly; and stigmata of propodeum and petiole greatly enlarged.

Discussion.—*Vachterbergia* and *Pneumosema* are hypothesized to form a monophyletic group weakly characterized by the short antenna, reduced mesonotal and propodeal sculpture, and very short hind wing cell CU. There is not enough material at



Figs. 67, 68. *Vachterbergia grayi*. 67, Fore wing; scale bar = 0.37 mm. 68, Hind wing; scale bar = 0.3 mm.

hand to determine whether the enlarged propodeal spiracle found in one of the three known species of *Vachterbergia* represents an independent acquisition or further reflects common ancestry with *Pneumosema*. Several members of the *Aspilota* group (Wharton 1980, 1985, Achterberg 1988, Achterberg and Bin 1981) have similarly short antennae and variously reduced body sculpture. *Aspilota* and related genera, however, can be separated as monophyletic on the basis of the greatly reduced mandibles and linear fore wing stigma (at least in females).

Pneumosema and *Vachterbergia* are known from only two and three species respectively. Further collecting and analysis of the Neotropical fauna may eventually turn up species which fill the morphological gap between the two. For the present however, both are adequately characterized as monophyletic and thus treated here as separate genera. *Vachterbergia* is represented in the material at hand by seven specimens, including the type series from Ecuador, a second species from Ecuador represented by a

single specimen (AEI), and a third species from Venezuela (TAMU). The latter is represented by only 2 specimens, one of which is illustrated in Figs. 58–66.

The genus is named in honor of C. van Achterberg for his many significant contributions to the study of Braconidae.

***Vachterbergia grayi* Wharton,
NEW SPECIES
(Figs. 67, 68)**

Description.—♀ *Head*: in dorsal view about twice wider than long. Face tall, smooth (as in Fig. 58), 1.2–1.35 × wider than high. Mandible with dorsal and ventral borders weakly converging distally; tooth 1 small and acutely pointed. Eye very large, temple nearly absent in lateral view (even more so than in Fig. 59); eye with a few, scattered, very short setae. Antenna (as in Figs. 61–63) 15–17 segmented. *Mesosoma*: narrow, about twice higher than wide; 1.4–1.5 × longer than high. Mesonotum with 3–4 pairs of scattered setae, length of setae as in Figs. 64, 65; notauli absent or nearly so; mesonotal midpit absent. Prescutellar pit

narrow, without midridge (as in Fig. 65). Propodeum with rugulose sculpture apically (posteriad spiracle), and with weak median carina sometimes present on posterior half; spiracle moderately large, distance to anterior margin about $3.5 \times$ its diameter, spiracle situated about half way between anterior and posterior margins. Pronotum laterally with finely crenulate posterior margin. Sternaulus shallow, short, crenulate, medially placed and only rarely weakly connected to anterior margin. Metapleuron (as in Fig. 64) smooth, polished, flat and with only 1–2 setae medially; ventral flange or knob virtually absent. Hind femur $3.35\text{--}3.55 \times$ longer than mid-width; hind tarsal claws short, strongly curved, about half length of fifth tarsomere. *Wings* (Figs. 67, 68): fore wing stigma narrowly wedge-shaped, about $4 \times$ longer than broad; 2-RSa $1.70\text{--}1.85 \times$ longer than 1-RSb; 2-RSb weakly curved, extending to wing tip; m-cu antefurcal by $0.3\text{--}0.6 \times$ its length; M + CU spectral basally, nebulous distally; cell 2CU about $6\text{--}7 \times$ longer than wide; 1 cu-a distad of 1-M by at least its own length. Hind wing with RS nebulous to spectral basally, absent or present only as a crease distally; 2-M barely visible at base; M + CU about half length of 1-M; 3 hamuli. *Metasoma*: petiole largely smooth and polished, very weakly striate posteriorly in two of the specimens; dorsal carinae weak, short, not extending beyond middle of petiole; dorsope large, deep. Ovipositor sheath with about 10 long setae. *Color*: pale brown; mandible, scape, pedicel, propleuron, pronotum dorsally and anterior-laterally yellow; apical 3–5 flagellomeres, legs, and palps somewhat lighter yellow to nearly white (tibia darker than coxa and trochanters); wings weakly infumate. *Body length*: 1.5–1.9 mm.

♂: unknown.

Material examined.—Holotype ♀: "ECUADOR: Pinchincha 47Km. s. Santo Domingo Rio Palenque Station III.1976. S&J Peck" (CNC). Paratypes: 2 ♀, same locality and collector, 22–31.vii.1976 and 18–

30.v.1975 (CNC, TAMU); 1 ♀, same as holotype but 16 km S.E. Santo Domingo, Tinalandia, 680 m, 15–30.vi.1975, Peck (CNC).

Diagnosis.—In addition to the generic characters, this species may be recognized by the pale mandible with acutely pointed tooth 1; mesonotal setae reduced to 3–4 pairs; head about twice wider than long; hind femur less than $4 \times$ longer than broad; and petiole largely smooth and polished. I have seen a slightly darker species from Venezuela with rounded tooth 1 (Fig. 60), greater number of mesonotal setae, slightly less compressed head, more slender femur, and more distinctly striate petiole. I have also examined a third species from Ecuador with a uniformly dark brown head and body, and enlarged propodeal spiracles.

Discussion.—This species is named for Kat Gray, for contributions entomological.

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